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On Ovogenesis and the Formation of the Interstitial Cells of the Ovary.*

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(Communicated by Prof. Ernest H. Starling, M.D., F.R.S.).

IN sections of mammalian ovaries, a considerable number of cells can be seen, which are not connected with the Graafian follicles, and which are evidently not connective tissue cells; these are the interstitial cells of the ovary. Their presence was noticed by most of the early writers on the ovary, but a certain amount of confusion has arisen, on account of the varied terminology which has been assigned to them, viz., Stromazellen (Schrön), Plasmazellen (Waldeyer) and Körnezellen (His). The stroma cells are the connective tissue cells, and, as such, aid in forming the supporting tissue of the ovary, whereas the interstitial cells lie embedded in the connective tissue, and are distinguishable from the stroma cells by their rather larger size and by the presence of a rounded nucleus.

No function was ascribed to these cells by the early observers; indeed, very little was known of the functions of the ovary as a whole, beyond the main fact of its being the organ for the production of the female sexual cells. Brown-Séquard [1] (1889) appears to have been the first to suggest an internal secretion for the ovary concerned presumably in the production of the secondary sexual characteristics. Since then, many experiments have been performed with a view to the investigation of the presence, and mechanism of production of, the internal secretion; the results of some experiments on animals whose ovaries had been transplanted from their original

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site, led Limon[2] to suggest that the interstitial cells were probably concerned in the process.

These results made the origin of the interstitial cells a matter of great interest, and, in order to study the question, I investigated the ovaries of embryo and young rabbits; the results obtained were published in 1905.[3] It appears probable that the origin of any particular variety of cells would be the same in all mammals, but it seemed advisable to investigate the point on another type of animal. For this purpose another series of investigations have been carried out upon the rat, and the results are given below.

The origin of the interstitial cells is so closely bound up with the rest of the ovary, including the ovogenetic changes, that some account of this must be given.

The development of the ovary may be considered as taking place in three main phases:—

1. The formation of the germinal epithelium.
2. The period of epithelial invaginations, resulting in the formation of a cortical and a medullary zone.
3. The changes occurring in the cells of the cortical zone.

(The medullary or mesoblastic zone will not concern us.)

I. The Formation of the Germinal Epithelium.

The term "germinal epithelium" or "Keimepithel," was first applied by Waldeyer to the tissue covering the site of the future ovary. He considered that this tissue arose by proliferation and differentiation of the original peritoneal covering, and he traced the formation from it of ova, or germ-cells. (Hence the term "germinal epithelium.")

Waldeyer's[4] nomenclature and observations have been accepted by most subsequent observers, notably by Balfour[5] and Kölliker.[6] The differentiation takes place very early, and should be looked upon rather as a specialized formation of that part of the cœlomic cavity, than as an actual product of the peritoneum.

Recently, however, Beard[7] and Adams Wood[8] have described the formation of the germinal epithelium in elasmobranchs by the migration of cells from the yolk-sac; this migration has not been observed in mammals, but if it be true it throws the formation of the cells of the germinal epithelium back to a much earlier period, and would indicate that they are probably differentiated during the very early divisions of the fertilized ovum, as is the case in some of the lower classes of the animal kingdom., *e.g.*, for ascaris (Boveri[9]), diptera (Weissmann[10]) and cymatogaster (Eigenmann[11]).

II. Formation of Cortical and Medullary Zones.

In 1838, Valentin[12] described the presence of tubules in a developing ovary, and the same appearance was observed by Pflüger[13] in 1861, who believed these tubules to be derived from the covering epithelium, and to give rise to ova and possibly also to the follicle cells.

The tubular origin of the ovary has not, however, been confirmed by the majority of subsequent investigators.

Waldeyer[4] considered that the mesoblast underlying the germinal epithelium grew up around the germinal cells, cutting off clusters of them, and thus producing the appearance of ingrowths—this was also the opinion of His,[14] Kölliker,[6] Mihalkovics[15] and others, while Foulis,[16] and later, Coert,[17] believed that downgrowth of the germinal epithelium and upgrowth of the mesoblast occurred simultaneously; v. Winiwarter[18] describes only invaginations of the epithelium in solid strands; it is easy to see how the idea of the presence of tubules has arisen, since in some animals the strands very much resemble the walls of a tube, but no lumen can be seen.

In either case, the result is the production of two zones. The outer, or critical zone, consists of clusters of cells derived from the germinal epithelium with processes of mesoblast in between. The clusters of cells do not at first occupy the entire ovary, and thus the most central portion, the medullary zone, consists still of mesoblast, which becomes differentiated to form the vascular and supporting tissue for the specialized structures derived from the germinal epithelium.

III. Changes in the Cells of the Cortical Zone.

The changes which occur among the cells of the cortical zone derived from the germinal cells, are very complex. All observers agree that these cells give rise to ova, and, nearly all, that the follicle cells are likewise derived from them (*cp.*, Pflüger,[13] Balfour,[5] Nagel,[19] v. Winiwarter and many others). The only dissentient authors appear to be Foulis, Schrön[20] and Wendeler,[21] who believe the follicle cells to be derived from the mesoblast. In my previous paper it was shown that the interstitial cells in the rabbit also arise from the germinal epithelium. Ova, follicle cells, and interstitial cells have therefore a common origin, and, all the cells of the ovary which are connected in any way with the sexual functions are derived from the germinal epithelium.

It is evident that a great many changes must occur in the formation of these varieties of cells from a common source. Those which occur in the production of ova, have been very fully described by v. Winiwarter for the rabbit, and also in a 7 months human fœtus. These changes consist almost entirely in changes in the nuclear chromatin, and are briefly as follows:—

I. *Early changes.* These consist in division and differentiation of the germinal cells; three nuclear forms are described:—

(*a*) Protobroque nuclei, var. a.
(*b*) Protobroque nuclei, var. b.
(*c*) Deutrobroque nuclei.

Protobroque nuclei, var. a. These are the original germinal nuclei, and they have a very granular appearance; a few lumps of chromatin are scattered about quite irregularly and there is no true reticulum.

Protobroque nuclei, var. b. These are derived from the preceding by division and subsequent differentiation. The change consists in a decrease in the density of the granular appearance, and the presence of some fine chromatin filaments.

Deutobroque nuclei appear in the embryo rabbit's ovary at about the 23rd day of pregnancy: they are large and very clear—the granular appearance has gone, and the chromatin is disposed in reticular formation; they stand out very strikingly (as I can state from my own observations) by reason of the clearness of the nuclei.

II. *Later ovogenetic changes.* The later ovogenetic changes are classified under five headings.

(*a*) Leptotenic.
(*b*) Synaptenic.
(*c*) Pachytenic.
(*d*) Diplotenic.
(*e*) Dictyate.

These various changes may be summed up as follows. The original nucleus in the early embryonic ovary shows irregular masses of chromatin and is granular. The first change is a gradual disappearance of the granules, accompanied by the formation of a more or less definite reticulum. The true ovogenetic changes then set in; the reticulum becomes broken up with the formation of a long fine skin which winds irregularly about the nuclear area (*leptotenic stage*); the skin gradually becomes massed together, until it forms a dark mass, at first held to the sides of the nucleus by fine threads,

though ultimately these also are drawn in and become coiled up with the rest of the chromatin. The whole chromatin now lies heaped up at one side of the nuclear area; the filaments are probably arranged in pairs, which are in apposition (*synaptenic stage*).

The next process consists in the unwinding of the skin. Gradually thick cords spread away from the mass of chromatin, and unfold themselves over the nuclear area; each of these is apparently derived from the firm apposition of two of the original chromatin threads (*pachytenic stage*). Very shortly the cords split along their whole length: at first the splitting is evident, because the two halves remain near to one another (*diplotenic stage*), but they soon pass away and are again distributed over the nuclear area, and gradually take on a reticular formation (*dictyate stage*). The ovogenetic changes are now completed. The nucleus of the ovum has passed through a variety of phases, and entered upon a period of rest. The significance of these changes is of great interest: it would seem that they must be ultimately connected with the reduction of the number of chromosomes, which occurs in sexual cells before fertilisation, but the question is very complicated, and beyond the scope of this present paper.

The Changes in the Rat.

Methods. A series of ovaries of embryo rats about 2 days before birth, up to 12 days after birth, were examined.

Two series were obtained, one fixed in Hermann solution (using however 1 per cent. osmic acid, instead of the usual 2 per cent.) and the other series in Gilson's solution: the sections were stained with iron hæmatoxylin, after the method of Heidenhain, which gives good results, if the sections are left long enough in both solutions. The sections fixed in Gilson's fluid were many of them stained with hæmalum, and some of the Hermann sections with a modified method of triple staining described by Bonney.[22]

Description of results. A section through the ovary of the rat about 2 days before birth, shows the ovogenetic changes well started. Thick, rather irregularly arranged strands of cells pass deeply inwards from the germinal epithelium, reaching, in some cases, almost to the hilum. There are no cells to be seen corresponding exactly to the deutobroque cells in the rabbit: *i.e.*, there are no clear cells with reticular chromatin network, standing out from the rest, in virtue of their clearness. The cell which I consider represents the earliest stage of ovogenesis is shown in fig. 1: there is a definite chromatin reticulum, of a coarser texture than in the true deutobroque nucleus,

and the general appearance is much more opaque. These nuclei are not to be found at any later period, and are, therefore, I conclude, passing into the next stage, viz., the *leptotenic*. Of these, a large number are to be seen in the ovary, at this age. In the leptotenic nucleus the groundwork is clear, the nuclear area being occupied by fine chromatin threads, which are distributed irregularly and apparently form a long skein. The appearance of the filaments is distinctly that of granules in apposition (fig. 2).

The next phase is the *synaptenic*. This stage is best studied in the embryo just before birth: the loose filament of the leptotenic stage has become massed together towards one side of the nucleus, remaining attached to this side by a few fine filaments, but the massing is not so marked, nor does it apparently proceed to such extreme limits as in the rabbit (fig. 3 and 4). The succeeding phase, the *pachytenic*, is seen only between the first and third days after birth. The chromatin is now distributed in thick cords, with a granular structure, which is even more marked than in the leptotenic phase. The distribution of the chromatin is irregular. In most cases the cords are attached to a central mass, from which they pass in loops, which do not in all cases fill the nuclear area. The great thickness of the cords is very striking compared with that of any other stage (figs. 5 and 6).

The penultimate stage is ovogenesis, viz., the *diplotenic* is not seen till after the second day. It is the most striking feature in sections taken from ovaries of the third and fourth days after birth, and may occasionally be found even later.

The cords of the previous stage have given place to much finer threads, upon which there are nodules of chromatin.

In many cases two threads are lying parallel to one another, and close together, showing that they have been formed by a longitudinal division of the former cord. In other places the threads are no longer parallel, but are crossed, or twisted, suggesting the beginning of the reticular formation, which is the chief feature in the next and last phase (see fig. 7).

The last phase, which is to be seen first in sections taken from ovaries of the fifth day, is the *dictyate*. Here the nucleus is large and clear—the chromatin is distributed in reticular formation, and there are one or two well-marked nucleoli (see fig. 8). The nuclei are those of fully-formed ova, and their activity, as demonstrated by changes in the chromatin, is at an end. It is worthy of note, that in the rat, as was also observed by v. Winiwarter in the human fœtus some cells whose nuclei are still in the diplotenic condition, become

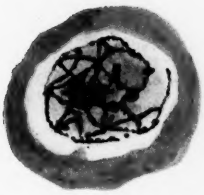

Fig. 1.

Early ovogenetic stage.

Fig. 2.

Leptotenic stage.

From ovary 2 days before birth.

Fig. 3.

Early.

Fig. 4.

Late.

Synaptenic stage.

From ovary about 1 day before birth.

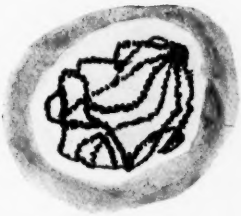

Fig. 5.

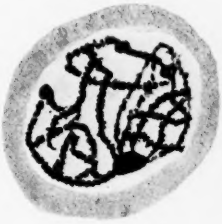

Fig. 6.

Pachytenic stage.

1st day after birth.

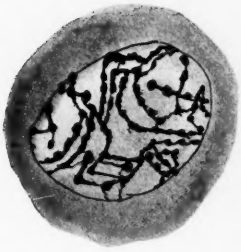

Fig. 7.
Diplotenic nucleus.
3rd day after birth.

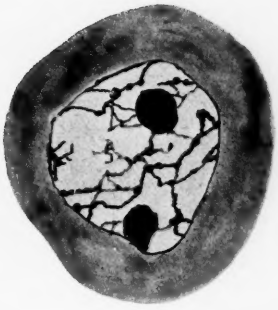

Fig. 8.
Dictyate nucleus.
7th day after birth.

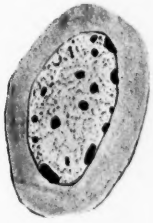

Fig. 9.

Fig. 10.

Cells of germinal epithelium.
From ovary about 2 days before birth.

Fig. 11.

Fig. 12.

Cells in ovary—about 2 days before birth.

surrounded by a layer of follicle cells, and the last differentiation thus takes place at a period when the ovary is beginning to assume the adult formation.

By the sixth or seventh day after birth the ovogenetic changes are at an end, except in a few isolated cases, the cells have dictyate nuclei, and are, for the most part, surrounded by follicle cells (*cp.* fig. 19).

There is no particular locality in the rat's ovary where ovogenetic changes begin—practically all the cells which will become ova start the changes at the same time, and pass through the same phases almost simultaneously.

Thus in any one section not more than two phases can be studied, whereas in the rabbit the ovogenetic changes start in the deeper layers of the cortical zone, and pass gradually towards the periphery, so that while the later stages may be seen in the deep part of the cortical zone, the early changes are only beginning near the periphery, and it is then possible to observe all the changes in a single section.

All these changes are so similar in the rat, in the rabbit, and in man, we may safely conclude that they are fundamentally the same in all mammals although there are probably slight differences. This is especially the case in regard to the time when these changes occur. The rat and the rabbit both start the changes before birth, and the changes are continued after birth. In the seven months' human fœtus they were already in full swing with commencing follicle formation (*cp.* v. Winiwarter) although some ovogenetic nuclei were found 5 days after birth.

Although I have not been able to study fully the changes in the guinea-pig, I have ascertained that in this species the ovogenetic changes are at birth already at an end.

The Origin of the Interstitial Cells in the Ovary of the Rat.

The cells of the germinal epithelium in the rat are of fair size, and somewhat irregular in outline; the chromatin is disposed in several masses of irregular size and shape, the rest of the nuclear area being apparently filled with a granular material, probably fragments of chromatin, which renders the nuclear groundwork very dark (see figs. 9 and 10). These correspond to v. Winiwarter's protobroque nuclei, var. a, and can be seen in the germinal epithelium in any of the sections examined, although they are not so numerous in the older ovaries.

About 2 days before birth, below the germinal epithelium and quite irregularly distributed, cells are found in which nuclei show rather more differentiation: their outline is in many cases very irregular, and shows indentations on one side or sometimes on both sides, suggesting a commencing amitosis. The later stages of amitosis do not, however, appear to be present, so that the irregularity is probably accidental. The irregular chromatin masses are still present to some extent, but in some places there are fine chromatin threads, and some of the masses have short processes passing away from them; the nuclear area is still dark and is occupied by granules, but there is a marked clearing around the chromatin masses where differentiation has begun.

Later, just before birth, the differentiation is greater, and, after birth, is still more marked (see fig. 13 and 14): the changes proceed along the same lines throughout, and consist in a gradual formation of filaments at the expense of the chromatin masses, and apparently also of the granules—these last are not seen around the differentiating masses, and the whole nuclear area is much clearer.

By the third day the change is very marked (see figs. 15 and 16), and in some nuclei has proceeded rather further than in those figured. By the seventh day the process of differentiation is nearly completed (see fig. 17), but there is still a residual granular zone around the margin of the nucleus. This disappears by the ninth day, when there is a definite reticulum, and the nuclear groundwork is clear (see fig. 18).

The nucleus has now reached its full differentiation, and is ready to perform its part in the work of the ovary. Meantime, great changes have been taking place in the general configuration of the ovary.

Before birth, the epithelial ingrowths are arranged in irregular solid strands, as already described, and the nuclei of the cells in the strands are undergoing ovogenetic changes. Interspersed with these cells are smaller cells, few, but gradually increasing in numbers, which are distributed irregularly over the cortical area. These cells undergo the process of differentiation which has just been described.

About the third day some of the cells begin to arrange themselves around the diplotenic nuclei of the developing ova, and thus form the follicular epithelium. The cells which become follicle cells have rather more differentiated nuclei than those which remain scattered in the cortical zone. The formation of the follicles proceeds rapidly, the greater part of the differentiating cells being used to form the follicular epithelium. There are, however, a certain number of cells,

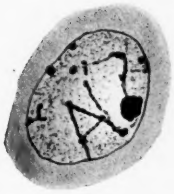

Fig. 13.

Cell from ovary
just before birth.

Fig. 14.

Cell from ovary
just after birth

Fig. 15.

Fig. 16.

Cells in ovary of 3rd day.

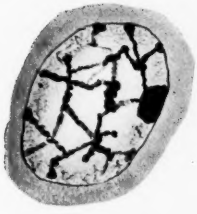

Fig. 17.

Cells in ovary
7 days after birth.

Fig. 18.

Cell from ovary
9 days after birth.

Fig. 20.

Cell from ovary 7th day.
Karyolysis.

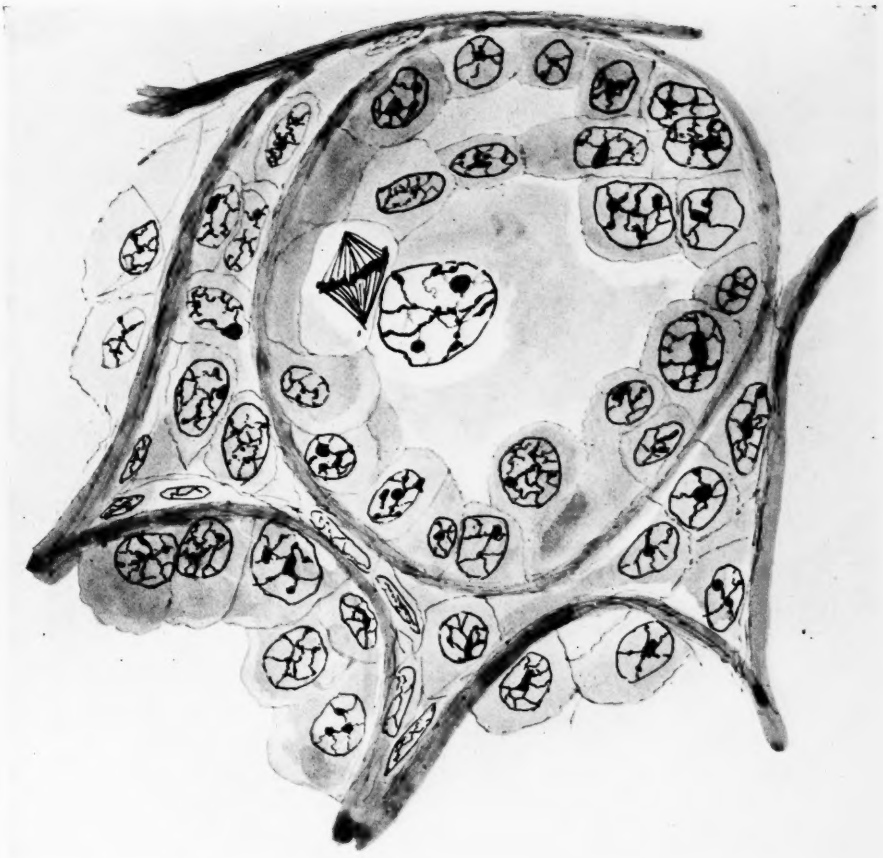

Fig. 19. From ovary 7 days after birth.

Showing one whole follicle with contained ovum, the nucleus being in dictyate condition; around are portions of other follicles, and interstitial cells lying in the intervening areas.

which remain grouped together in the spaces between the follicles. These are *the interstitial cells* (see fig. 19). They have passed through the same stages of differentiation as the follicle cells, and are derived from the same source. When follicle formation is first beginning the follicle cells show greater nuclear differentiation than the rest, but by the ninth day the nuclei of the interstitial cells have reached the same degree of differentiation as the follicle cells, and are indistinguishable from them, except by their position.

The interstitial cells do not form such a prominent feature in the rat's ovary, as in that of the rabbit, as they are not present in such large numbers.

Both follicle and interstitial cells appear, therefore, to be derived from the germinal epithelium by a process of differentiation. I have not been able to trace all the stages between the germinal epithelium cells and the early ovogenetic condition in the rat, having failed to obtain an animal at the right stage of pregnancy. The gestation period is 20—21 days in the rat, and there is no trace of any such changes at the 14th day, so that the 16th or 17th day would probably be about the right period.

Degeneration Changes in the Nuclei.

One feature still remains to be noticed, namely that of karyolysis. This is present more or less at all stages, and it is difficult to understand why cells which seem to be just entering upon their career, should degenerate and perish.

v. Winiwarter describes three different forms of karyolysis in the rabbit. In one the appearance is that of an irregular, or incomplete mitosis; in another, the chromatin is in rounded masses; in a third, it is gathered into rather thick, long, and irregular masses arranged chiefly round the nuclear membrane. In some cases there are masses in the centre as well, which are connected with those at the margin by fine filaments.

In the rat only the first and third forms appear to be present. The first form is rare, and only present in the younger ovaries examined, while the third form is abundant, especially among the young follicle cells. Every variety can be seen, from those in which the whole nucleus is filled with rather regular masses connected together by filaments, to those figured (fig. 20): the stage represented in this figure is by far the commonest and is present in surprising numbers.

The liquor folliculi is just beginning to form in the young

follicles, about the ninth day. It is possible that the karyolytic nuclei have some connection with this, though in the formation of the liquor in the follicles of adult ovaries, the cells appear to gradually disintegrate and dissolve, without showing the phenomena of karyolysis. It appears, therefore, that the ova, follicle cells, and interstitial cells, are all derived from the germinal epithelium.

In every case the transformation involves nuclear changes, but whereas these are identical in the formation of the follicle and the interstitial cells, the formation of the ova is attended by a whole series of more complex alterations in the distribution of the chromatin.

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The Possibilities of Ovarian Grafting in the Human Subject, as Judged from the Experimental Standpoint.

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Although surgeons have recognized clinically, and have supported the experimental evidence of physiologists, that the ovary has some important influence not only on the menstrual and reproductive cycle, but also on the general metabolism of the female, the conservative treatment of ovarian tissue has not until recently taken a prominent place in ovarian surgery.

It is largely due to the work of Fraenkel and Kohn, supported by Limon and many others, that the production of an internal secretion by the ovary has become an accepted fact and has passed beyond the stage of hypothesis.

Whether this secretion is elaborated in the follicular epithelium as suggested by Fraenkel, or from the interstitial cells as shown by Limon, the importance of remembering this internal secretory function must not be forgotten in operative procedures on the ovary.

Thus total oöphorectomy has of late given place to more partial operations, and conservative surgery has been advocated by many surgeons, such as Bland-Sutton and Doran in this country, Pozzi in France, and Martin and others in Germany. Leopold, Mandl, Burger and many others have brought forward much clinical evidence in support of the conservative treatment of the ovary in hysterectomy and in tubal disease.

Apart from ovarian resection, investigation seems to point to ovarian grafting as an important means of retaining the ovarian influence. For while the majority of observers appear to hold that the ovary when transplanted is capable of exerting its double function of ovulation and internal secretion to a varying extent, there is much evidence to show that the ovary by grafting becomes destroyed, if not wholly, to a considerable extent, and further the results obtained have differed greatly in the hands of different experimenters.

In order, therefore, to get some idea personally as to the value of

ovarian grafting from the surgical standpoint, the following experiments were carried out in the Laboratory of the Edinburgh Royal College of Physicians, with the purpose of finding out

1. Whether grafted ovaries degenerate.
2. If they do degenerate, to what extent.
3. What part of the ovary is most affected.
4. If ovarian tissue lives, has it the power of performing its functions.

The feasibility of ovarian grafting in the human subject was suggested by Chrobak. As a result of his clinical experience, he stated that an artificially induced climacteric is much more severe than the physiological one, and is more severe the younger the woman, and he therefore strongly advocated the preservation of ovarian tissue where possible.

His assistant Knauer (1) transplanted the ovaries of rabbits in various positions, such as in the uterus, and between the layers of the abdominal wall, and from those experiments he concluded that ovaries can not only be transplanted but are capable of producing ova and retaining their functions. In one case he claims to have seen pregnancy go to full term 16 months after transplantation. He claimed that after a period of two years, a grafted ovary maintained its normal structure.

Arendt (2) on the other hand found that after transplantation of the ovaries in 11 cases, there was always atrophy with absorption of the ovary in from 6 to 12 weeks.

Limon (3) in 5 cases of transplantation found marked atrophic changes, followed by regeneration more especially in the interstitial cells. He examined transplanted ovaries 15, 60, 88, and 107 days after operation. The interstitial cells ran together to form a sort of epithelioid cell, returning gradually to the normal as the circulation became re-established.

Knauer's results were confirmed later by Grigorieff (4) who records pregnancy and the birth of a fully developed fœtus after transplantation in 4 cases.

Marchese (5) transplanted ovaries between the parietal peritoneum and the psoas, and between the abdominal fascia and the rectus muscle, and believes that auto-plastic and hetero-plastic transplantation is possible.

Ribbert (6) 30 days after transplanting the ovaries in the mesometrium and uterine horns, found that the superficial part of the ovary was well preserved, but the central portions had become

degenerated and replaced by connective tissue. The shape of the ovary was maintained, and the primordial follicles were capable of growth and ripened in the normal manner.

McCone (7) also reports full-time pregnancy after grafting in the same animal, or from one animal to another.

In a second publication Knauer (8) states his belief that transplanted ovaries in rabbits are functionally active 3 years after operation, while Herlitzke (9) believes as the results of 40 experiments on guinea-pigs that the ovaries almost entirely degenerate.

In transplanting ovaries from one animal to another, Foa (10) found that young ovaries changed their character according to the age of the new host. When grafted on to a full-grown animal, the ovary took on the character of the fully-developed organ, while on an old animal, it became degenerated and was absorbed.

Halban (11) has induced menstruation in monkeys by grafting ovaries under the skin, while Marshall and Jolly (12), in a recent communication to the Physiological Society, bring evidence to show that ovarian grafting may prevent atrophy of the uterus.

Recently Basso (13) has shown that transplanted ovaries undergo marked degeneration followed by more or less regeneration, capable of preventing the uterus, Fallopian tubes and mamma from degenerating. His observations only extended up to a period of four months.

Carrel and Guthrie (14), in discussing recently the varying results obtained by different observers, are inclined to attribute non-success to faulty technique, and suggest, while recording one experiment, the transplantation not only of the ovary but its blood-vessels and the corresponding piece of aorta and vena cava from and to which they pass.

In considering, therefore, the work of so many observers, it was difficult to satisfy oneself as to the probable value of transplantation as applied to the human subject, not only from the evident failure of the experiments in many animals, but also from the inadequate microscopical evidence of the state of the ovaries given by many of those who claimed success.

Complete functional activity of transplanted ovaries is claimed by Knauer and Grigorieff in whose animals pregnancy occurred after removal of the ovaries and auto-plastic grafting.

Similar success has been obtained by Morris, Glass and Dudley in the human subject.

Personal Observation from Experimental Evidence.

The experiments were carried out for the most part upon rabbits, full grown, but varying considerably in age.

The sites of transplantation were the uterus, parietal peritoneum, between the layers of muscles of the abdominal wall, and under the mammæ.

In all, 21 ovaries were transplanted, and of these complete failure occurred in 6 instances. In two of these cases, the transplantation had been performed nearly one year previously, and in both instances not a single trace of the ovary was to be seen, the other failures being after intervals of 3 months and 4½ months, so that considered relatively to the duration of the sexual life of a rabbit, the tendency to degeneration and final absorption of a successfully grafted ovary is not a rapid one, and one cannot support the view of Arendt that they always degenerate in from 6 to 12 weeks.

Influence of site upon its growth. Twelve were transplanted between abdominal muscles including two cases which were submammary; the rest were stitched to the parietal peritoneum. In comparing the advantages of the two sites, the balance in favour of intra-muscular grafting is decided. This is most markedly seen in the case of the Graafian follicles. In one peritoneal graft, however, there was complete success, and although there was no ripening of Graafian follicles, all the different portions of the ovary were healthy. On the other hand, absorption also occurs. It is interesting in this connection to note that of three rabbits in which double ovarian grafting was done intra-muscularly, absorption of both ovaries occurred in one, while in both the others, one ovary had been completely absorbed, the opposite ovary showing well-marked preservation of all the different parts of the ovary, so that the success of the grafting does not seem to depend upon the action of the blood serum as suggested by Morris, but on purely local conditions.

Age and condition of the animals. These varied considerably. In two cases the animals were pregnant at the time of transplantation, and in each case the rabbit aborted within a week of the operation. This is of interest in view of Marshall's recent observations on the effect of oöphorectomy in early pregnancy. If one is to accept his views, it would appear that the transplanted ovary is not capable of exerting its influence immediately after grafting, and also that the influence of the ovarian secretion does not extend over any period of time, which would seem to point to the elaboration of the secretion as a continuous and not a periodic occurrence.

The results obtained seem to have been best in young animals, for

Fig. I. Ovary × 35. 5 months after transplantation. Shows degeneration. (*a*) Necrotic internal zone. (*b*) Infiltration zone. (*c*) More or less healthy stroma.

Fig. II. Ovary × 10. 4½ months after transplantation. Cystic degeneration. Cysts derived from Graafian follicles.

in those graftings in which Graafian follicles and germinal epithelium were present, the animals were at the time of operation scarcely full grown (*e.g.*, Nos. 13 and 21).

Of the 14 animals that were weighed at the time of operation and at death, all, without exception, increased in weight.

Changes occurring in transplanted ovaries. The changes occurring in transplanted ovaries seem to be on the whole fairly constant. One must not, I think, expect that a mass of ovarian tissue of any size can ever become attached to its new position without undergoing considerable change. Although it is difficult to find out the actual amount of degeneration that occurs from the writings of those workers already referred to, Limon, Ribbert, Herlitzka, and most authorities acknowledge partial degeneration. Limon records degeneration of the whole ovary (including the Graafian follicles) except the peripheral zone. Marshall and Jolly state in a recent communication to the Physiological Society that in rats they have succeeded in grafting the entire ovary without any degeneration.

Similar success has been obtained in the present series of experiments in one case, and while the possibility of improved technique may lead to greater success, I cannot but think that entire ovarian grafting in any but the smallest animals must be attended with more or less failure. As regards the human subject, the grafting of portions of the ovary will almost certainly be done with success, but successful entire ovarian grafting must be considered a matter of great uncertainty.

The above-mentioned experiments seem to show that there is extensive degeneration of the central portion of the ovary in most cases.

This central zone of degeneration occurs in the cells of the ovarian stroma, and the lutein tissue when present is surrounded by a well-marked zone of infiltration, in which the ovarian tissue undergoes partial change but is capable of regeneration as pointed out by Limon, while a peripheral zone of practically normal ovarian stroma of varying thickness persists. In this zone, however, the primordial follicles show evidence of degeneration in most cases. See Plate 1.

These three zones have been observed in transplanted ovaries from a fortnight to 5 months after operation.

In ovaries which exhibit these zones distinctly the primordial follicles do not seem to grow, but gradually disappear, old lutein tissue and ovarian stroma alone persisting.

The other changes seen are those in which the Graafian follicles enlarge, forming small cysts separated by a very thin stroma

of ovarian tissue, the stroma gradually disappearing so that the ovary is represented by a multilocular cyst. A certain number of follicles is capable of reaching maturity, but it seems probable that most of them degenerate. In many of these follicles, the membrana granulosa can be recognized in varying degrees of degeneration.

In two of the experiments the transplanted ovary, as a whole, remained undegenerated, showing the germinal epithelium, primordial Graafian follicles, and ovarian stroma in a good state of preservation (Plates 3 and 4), while in 13 out of the 21 transplantations there was almost complete success, in that Graafian follicles were present in 10 cases, and in 4 of these had matured and contained healthy ova with all the contents of the follicle intact.

Degenerative changes in different parts of ovary. The tendency to degenerate is most marked in the case of the germ epithelium, while the ova and then the Graafian follicles are next in order of frequency. Ovarian stroma and more especially lutein tissue could be recognized in 15 out of 21 experiments. Plates 5, 6 and 7.

These results do not agree *in toto* with those of Herlitzka, who believes that the germinal epithelium persists more frequently than the other parts of the ovary.

These experiments, though not presenting ovarian grafting as an operation invariably to be attended with success, have satisfied me that the whole ovary or part of it does live, in its new position.

To what extent this ovarian tissue is capable of performing its functions is much more difficult to determine. Its power to ovulate must be admitted, but its power to exert its internal secretory function, little as we yet know about its mechanism under normal conditions, must be looked upon with considerable doubt. If we are to accept the view of Sokoloff and exclude the action of the nervous system, there is every reason to expect that a transplanted ovary would be functionally active, except, according to some authorities, in those cases in which the uterus has been removed. Experimental evidence, however, has not tended altogether to support the views of Abel and Zweifel.

Again, if a small portion of ovarian tissue lives and is functionally active, one would expect compensatory hypertrophy, corresponding to that which Bond of Leicester has shown to occur in the normal ovary.

The condition of the uterus and Fallopian tubes in these cases has not been referred to, and I do not feel justified in drawing any definite conclusions from the few which I have examined. Marshall

Fig. III. Ovary × 12. 3 months after transplantation. Shows primordial follicles, ovarian stroma, and lutein tissue in good state of preservation.

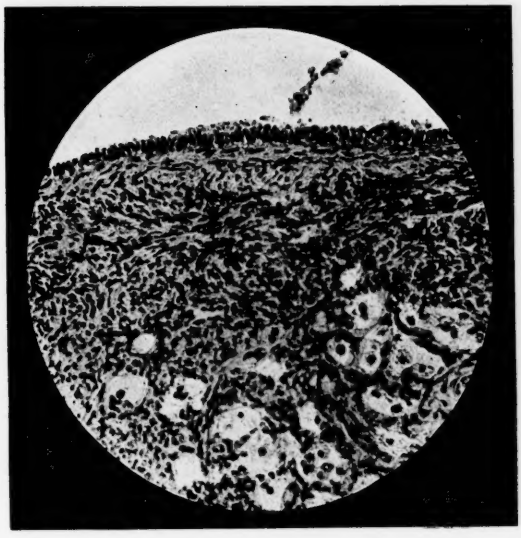

Fig. IV. Ovary × 200. 3 months after transplantation. Germinal epithelium and primordial follicles healthy. High power view of Fig. III.

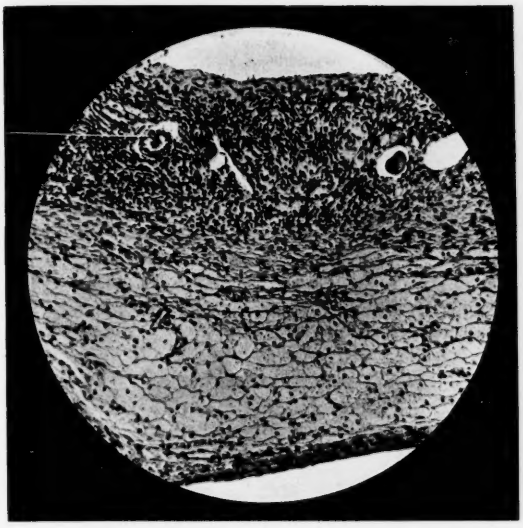

Fig. V. Ovary × 100. $4\frac{1}{2}$ months after transplantation. Shows (*a*) small primordial follicle, ovarian stroma, and lutein tissue.

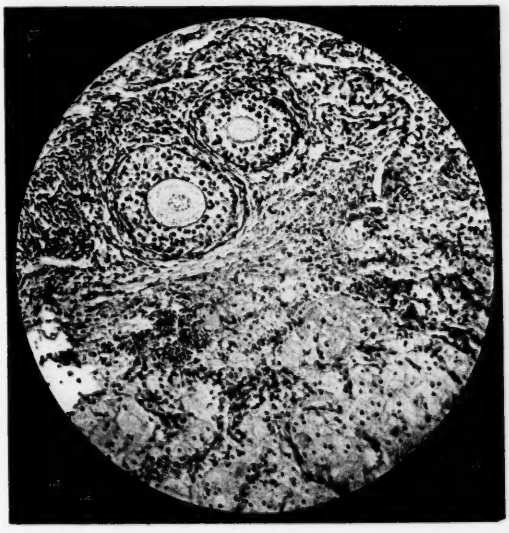

Fig. VI. Ovary × 100. 3 months after transplantation. Two healthy Graafian follicles with membrana granulosa and ova.

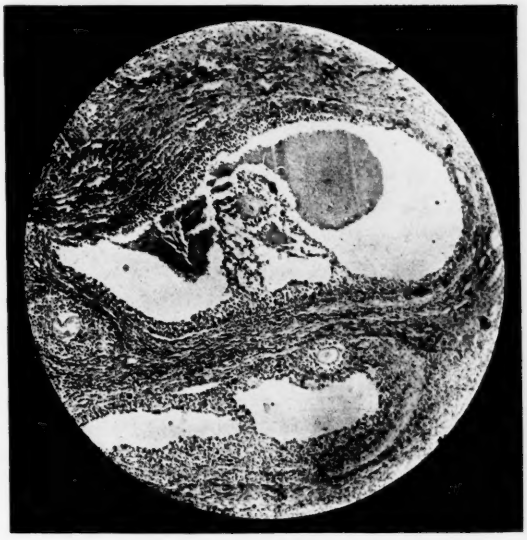

Fig. VII. Ovary × 45. 3 months after transplantation. Shows fully matured Graafian follicles, with ova and membrana granulosa.

and Jolly have, however, shown that after three months, the uterus has been normal after transplantation of the ovaries, although this period seems to be rather a short one from which to draw definite conclusions as to degenerative changes.

In one case in which I examined the uterus after 9½ months, and in which some ovarian tissue was present in the transplanted ovaries, there were marked fibrous degeneration and atrophy of the uterus, while in others examined 3 and 4 months after transplantation, in which there was considerable degeneration of the ovary, the uterus showed little change from the normal.

As to its application to surgical practice, it must always be looked upon as a means of preserving ovarian tissue, when that is desired by the surgeon. Successful grafting of the entire ovary in the human subject seems to me to be impracticable, and one would be inclined to suggest that grafting of strips of the cortical zone, containing the germ epithelium, tunica albuginea and primordial follicles, would give the best results.

The preservation of the ovarian tissue seems to depend considerably on the site of implantation, and where pregnancy is not desired, there is much greater chance of a successful result from transplantation on to the parietal peritoneum.

In considering the question of pregnancy after transplantation, the most obvious criticism of the cases recorded by Knauer and others in animals is the possibility of portions of the ovary having been left behind. This was a point raised by Arendt, and certainly, from the practical experience gained by operating on rabbits, one feels that the criticism is justified, as extirpation of both ovaries through a single median incison, unless carried out with extreme care, is often associated with detachment of some portion of the ovary.

In the human subject it is difficult to understand why a complete oöphorectomy should not be certain, and one cannot understand why Morris should have used a crushing instrument to remove the ovaries more completely. One must also consider the possibility of the presence of accessory ovarian tissue more especially in the region of the ligament of the ovary as pointed out by Dauber.

Again, cases of pregnancy have been recorded by Gordon, Doran and others after double ovariotomy, where no transplantation was made. Thus while admitting that pregnancy can result from a follicle in a grafted ovary, as judged from the experimental standpoint, the evidence brought forward in recorded cases does not eliminate the obvious fallacy of incomplete removal.

Bearing on clinical surgical work. The results of these experiments show:—

1. That in the rabbit the whole ovary may be transplanted with success.
2. That in the majority of cases (about 80 per cent.) there is partial degeneration of the ovary.
3. That the ovary may undergo either a fibrous (atrophic) or a cystic degeneration.
4. That Graafian follicles and ova persist and mature some months after grafting, but ultimately tend to become cystic.
5. That the germinal epithelium persists in a small percentage of cases.

These results justify the following conclusions as far as grafting in the human subject is concerned:—

1. That it is unlikely that the whole human ovary can be grafted with success.
2. That part of the ovary may ovulate and preserve its function of internal secretion.
3. That partial grafting is more likely to succeed, *i.e.*, the grafting of the cortical portions of the ovary more especially.

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Mechanical Dilatation of the Cervix Uteri in Obstetrics.

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As there still exists a considerable difference of opinion as to the use of Bossi's and other mechanical cervical dilators, it seemed to me that it would be useful to place on record the following cases in which I made use of some form of mechanical dilatation of the cervix during the time that I held the post of Resident Surgeon to the Eden Hospital for Women, Calcutta.

Case i. B., a Mahomedan and a primigravida, aged 16, was admitted into the Hospital at 5-45 p.m., on May 27th, 1903.

She stated that she had been in labour for 3 days. The membranes were unruptured; the cervix was thick and very rigid; the os just admitted one finger. A dose of potassium bromide and chloral hydrate was given, and repeated after 4 hours, but with no effect. At 8 a.m. next day a cocaine suppository was placed inside the cervix; at 12-30 p.m., in spite of regular pains at about 10 minutes' intervals, no progress was made, so at 1-30 p.m., Bossi's dilator was inserted and dilatation was, under chloroform, completed in 10 minutes up to 10 cm. The membranes were ruptured during the operation; the head immediately came well down, and the child was born in 20 minutes. A second bag of membranes then presented, and as the placenta of the first child was not born within a reasonable time, this was ruptured, and a second child, presenting by the breech was delivered naturally in 5 minutes. A single placenta was expelled 55 minutes later. Both children were premature (about the 7th to 8th month) and died 4 and 5 days respectively after birth. The mother made an uninterrupted recovery.

Case ii. Mrs. R., a European, aged 23, was admitted on Jan. 11th, 1903. She had had three children previously. She stated that her last labour 18 months ago was very difficult, and that instruments were used; also that she had had instrumental delivery with her second child. She had now been in labour 3 days; the os admitted one finger, the pains were feeble. At 2 p.m. on June 12th, the dilatation was sufficient to admit 3 fingers; the pains were stronger,

but the temperature and pulse were rising. Potassium bromide and chloral hydrate were given. At 4 p.m., there was no progress. Bossi's dilator was therefore introduced under chloroform, and the os dilated in 9 minutes to 10 cm. The membranes were punctured, and the child, which was presenting by the breech, was delivered with great difficulty, groin traction having to be made, and forceps having to be applied to the after-coming head. The mother made an uneventful recovery, and the child also did well.

Case III. H., a Hindu, aged 25, was admitted at 6 a.m. on Sept. 4th, 1903, in an eclamptic state and unconscious. The friends stated that she had had one child a year previously.

She had been in labour three days. The cervix just admitted two fingers; the membranes were intact; the vertex was presenting. Half-a-grain of morphia was given hypodermically, and a large simple enema administered, followed after one hour by a rectal injection of normal saline solution. Chloroform was given during the fits, of which there were sixteen from the time of admission up to delivery. At 11-35 a.m., no progress having been made, and the pulse being 140, temperature 101°F., and fits still occurring, chloroform was given; the cervix was dilated to 10 cm. with Bossi's dilator, and the child delivered with some difficulty (due to pelvic contraction) by means of axis-traction forceps. The child only gave one gasp and all efforts at resuscitation proved useless. The placenta was expelled in 20 minutes. Although she had eight fits after delivery, the mother ultimately made a good recovery.

Case IV. D., a native Christian, aged 23, was admitted Oct. 8th, 1903. She had had one child about nine months previously. She was now seven months pregnant, with œdema of the legs, and fever. There was a trace of albumen in the urine. Her condition became worse after admission. The œdema increased, she passed very little urine, and ascites developed. Labour set in at 4 p.m. on Oct. 27th, but the progress was very slow. A Champetier de Ribes's bag was introduced, but was expelled in about half an hour; the bag had deteriorated by having been kept in this hot climate, so that on its expulsion the os only admitted two fingers. Bossi's dilator was introduced under chloroform and the cervix was dilated in 26 minutes, up to 8½ cm.; the child, which was presenting by the breech, was easily delivered, and though asphyxiated was soon revived. The patient went from bad to worse, and in spite of all treatment died on the fourth day after confinement.

Case v. S., a Bengali, aged 25, was admitted Dec. 13th, 1903, having been transferred from the Medical College Hospital where she had been under treatment for cancrum oris and œdema. She had had two children previously. She was in a very weak and low condition and had marked œdema of the lower limbs, less of the face and upper extremities. The uterus reached to two inches above the umbilicus. No fœtal heart sounds could be detected. As she was doing badly and the œdema was increasing, it was decided to induce labour. At 3-30 on Dec. 19th, the cervix was digitally dilated to a sufficient extent to allow of the introduction of Bossi's dilator, by means of which it was further dilated up to 4 cm., and then a full-sized Barnes's bag was inserted, which was expelled at 10 p.m. On examination the dilatation still remained the same, and there were no pains. At 1 p.m. on the 20th a Champetier de Ribes's bag was put in. At 8 p.m. on the same date, on making slight traction, it came out, and on further examination the os was found to be dilated to only a little over 4 cm. Bossi's dilator was then reinserted, and the cervix dilated from 4 cm. to 9 cm. in 13 minutes. A premature infant, weighing 2 lbs., and measuring 16½ inches, was delivered by groin traction, and a second child weighing 2 lbs. 2 ozs., and measuring 16 inches, was delivered by the same method shortly after the first. The placenta was partially adherent and had to be separated with the fingers. The liquor amnii was offensive. Both children were swollen, with the skin discoloured and peeling off. The uterus was gently flushed out with iodine lotion. The patient was very restless after delivery and the pulse was quick. She had had a rigor, with a temperature of 104·2° at 1 p.m., shortly after the Champetier de Ribes's bag had been introduced. She became collapsed and died at 6 a.m. on the 21st.

Case vi. N., a Bengali and a primigravida, aged 18, was admitted December 18th, 1903, at 8 a.m., in an eclamptic state. She had been in labour 10 hours, and had had six fits before admission. The os admitted two fingers. The cervix was dilated with Bossi's dilator to 9 cm., and an asphyxiated child was delivered easily with forceps. The child was resuscitated with some difficulty. The placenta followed naturally in 10 minutes. The patient had three more fits, two before delivery and one after. She was treated with morphia hypodermically, chloral and potassium bromide by the mouth, and normal saline solution by the rectum. She made an uninterrupted recovery. The child died the day after birth.

Case vii. P., a Bengali, aged 21, was admitted at 8 a.m. on May 29th, 1904. She had had one child six years previously. She

had been in labour 27 hours. The membranes were ruptured; the os only admitted two fingers; the cervix was hard and rigid and the patient was having strong pains. At 3-45 p.m., as there was no progress and she was becoming exhausted, the cervix was dilated with Preiss's dilator from 4 cm. to 9 cm. in 15 minutes; the tissues were very rigid and exceedingly resistant to dilatation. The child was born naturally; it was badly asphyxiated and died five minutes later. The liquor amnii was thick and offensive. On June the 2nd, the discharge being slightly offensive, the uterus was gently curetted and douched with iodine lotion. With this exception recovery was uninterrupted.

Case viii. Mrs. W., a Eurasian, aged 42, who had had 14 children, the last 3½ years ago, was admitted on the 6th of June, 1904, with a threatened miscarriage at the 4th month.

On June the 12th, at 8-30 a.m., the membranes ruptured spontaneously. On making an examination the os admitted one finger and was rather rigid. At 1 p.m., no progress having been made in spite of frequent pains, the cervix was dilated with Preiss's dilator under chloroform from 3 to 7 cm. in six minutes, and a dead fœtus, with the skin peeling off, was delivered naturally; the placenta, being adherent, was removed with the fingers, and an intra-uterine douche given. The patient made an uninterrupted recovery.

Case ix. H., a Bengali, aged 20, who had had three children previously, was admitted August 3rd, 1904. She was said to be four months pregnant. She complained of a blood discharge. The uterus reached to 3¼ inches above the umbilicus, no fœtal heart sounds, movements, or parts could be detected. On vaginal examination the cervix was found to be taken up; the os just admitted one finger and was covered internally by what felt like a partially organized blood-clot. On withdrawal of the examining hand there was some slight hæmorrhage. One fluid drachm of the liquid extract of ergot was given at 12-15 p.m. A quarter of an hour after, strong pains came on, the patient became restless and passed a large blood-clot. At 1-15 p.m. the cervix was digitally dilated under chloroform sufficiently to admit two fingers, and then with Preiss's dilator from 3 to 6 cm. in 15 minutes; old fluid blood and clot and a hydatid mole passed during dilatation. The uterus was then thoroughly cleared out with the finger and an intrauterine douche of iodine lotion given. There was some slight collapse after delivery, but recovery was uninterrupted.

Case x. E., a Bengali, aged 25, a primipara, was admitted at 6-30 p.m., on October 2nd, 1904, with a temperature of 102·8°F. She stated that she had been delivered of a dead child at noon by a dhai (native midwife) outside. The uterus reached to the umbilicus and fœtal parts were felt. There was no bleeding. On vaginal examination a piece of bone was found lying loose in the vagina. The os just admitted one finger, and jagged pieces of bone were felt lying loose inside the uterus. Chloroform was given and the cervix dilated with Preiss's dilator from 3 to 8 cm. in 18 minutes. A fœtal head with lower jaw missing, the spine torn off and the cranium dented and crushed, was delivered. A second bag of membrane then presented and was ruptured, and a living six months child delivered, extensively bruised. The placenta which was adherent had to be digitally removed and an intrauterine douche of iodine lotion was given. The patient made an uninterrupted recovery.

Case xi. C., a Bengali, aged 14, a primigravida, was admitted at 9 a.m. on October 13th, 1904, in an eclamptic state, with a history that she was eight months pregnant, and that she had had nine fits outside, the first having occurred at 5 a.m. At 12 noon she had another fit (the first since admission to hospital). Under chloroform the cervix was dilated with Preiss's dilator from 3 to 8 cm. in 23 minutes, and a living child delivered with forceps; the placenta was expelled 50 minutes after. She had another and last fit (the second since admission) at 9 p.m. She was treated with morphia hypodermically, and thyroid extract by the mouth. Recovery was uninterrupted.

Case xii. K., a Bengali, aged 20, a primigravida, was admitted at 11 a.m. on October 23rd, 1904, in an eclamptic state. She had had two fits outside (the first at 10 a.m.) and she had six after admission into hospital, the last being at 1 p.m. The pains had begun at 3 a.m. On admission the os admitted two fingers. The cervix was dilated under chloroform with Preiss's dilator from 4 to 9½ cm. in 21 minutes, and a premature child weighing 5 lbs. was delivered naturally. The patient was treated with morphia hypodermically, and thyroid extract by the mouth. Recovery was uninterrupted.

Case xiii. S., a Hindu, aged 15, a primigravida, was admitted at 1-30 p.m., on November 24th, 1904, unconscious. She had a fit on admission lasting half a minute. The fits had begun at midnight on the 22nd. The uterus reached to midway between the umbilicus and the ensiform cartilage. The os admitted two fingers easily and was

soft. There was an offensive blood-stained discharge. After a copious vaginal douche of lysol, ½ per cent., the cervix was dilated with Preiss's dilator from 5 to 10 cm. in 8 minutes, the membranes were ruptured and a dead child was delivered with forceps. An intrauterine douche was given. The patient had fever on admission, which developed into a typical attack of enteric from which she died on the fourteenth day after delivery.

Case xiv. N., a Hindu, aged 25, a primigravida, was admitted at 8-15 p.m., on December 22nd, 1904. The abdomen was very pendulous; the vertex was presenting; the os admitted one finger; the cervix was not taken up; the pains were weak. At 6 a.m. on the 23rd, the membranes ruptured, the pains being still very weak. At 1-40 p.m., the patient had an eclamptic fit lasting for a minute. Under chloroform the cervix was dilated from 1 to 3 cm. with Preiss's dilator without caps. The caps were then put on, and dilatation continued from 3 to 10 cm. in 27 minutes. An attempt to deliver with forceps failed owing to the head being abnormally hard. Craniotomy was therefore performed. The patient made a good recovery.

Case xv. T., a Hindu, aged 16, was admitted at 8-30 p.m., on December 8th, 1904, in an unconscious and collapsed state. The friends gave the following history. She was about eight months pregnant, and had been treated all day outside by native doctors. She had had 8 to 9 fits at home, and she had one fit immediately on admission to hospital, lasting 2½ minutes, and a second a quarter of an hour after. There was slight œdema of the abdomen and lower extremities. The cervix was thick and taken up, the os easily admitted one finger. At 9-30 p.m., as she was becoming rapidly worse, one pint and threequarters of normal saline solution was given intravenously, and the cervix was rapidly dilated to the full with Preiss's dilator in about 20 minutes. The child, which was dead, was delivered by craniotomy, but in spite of all treatment the patient never rallied.

Case xvi. Mrs. A., an East Indian, aged 32, who had had three children previously, was admitted on January 5th, 1905, with a history of hæmorrhage during the later months of pregnancy, for which she had been treated by dhais outside. The vagina was found filled with some native drug. The uterus reached to 2 inches above the umbilicus, no fœtal heart sounds were heard. The cervix was partly taken up and the os admitted the tip of the index finger. The

placenta was felt presenting. A vaginal douche was given, and as the bleeding was increasing, at 1-30 p.m., under chloroform, the vagina was cleared of clots and the cervix dilated with Preiss's dilator from 5 to 10 cm. in 8 minutes with very little loss of blood. The placenta completely covered the os; it was perforated, and a child of about 7 months was delivered by traction. Recovery was uninterrupted.

In none of these cases was there any untoward effect which could be attributed to this method of dilatation, with the exception of some laceration of the cervix in cases 1, 2, 3, and 16, and only in one of these cases (viz., No. 2) was the laceration severe enough to call for immediate treatment, and here it did not extend beyond the vaginal portion of the cervix, and was repaired by three stitches on each side. In none of the other cases was the laceration of any appreciable size. The instrument used in the first six cases was Bossi's model; in the remainder, Preiss's modification of the same. This latter is far simpler, lighter and easier to clean than Bossi's dilator. Of all the various forms of mechanical dilators, I consider that theoretically de Seigneux's is undoubtedly the best pattern and least likely to tear the cervix, but since obtaining one of these instruments I have not had the opportunity of testing it practically, so I do not feel competent to give an opinion on its use, but when next I am treating a case in which mechanical dilatation is indicated, it is the one I shall undoubtedly choose. It will be seen that of the 16 cases above recorded, in seven dilatation was resorted to for eclampsia, in six for rigid cervix, in one each, for induction of labour, hydatid mole, and placenta prævia. From my personal experience of the use of these dilators, I think that they have a distinct place in obstetrical practice, but that the number of cases in which their use is indicated is limited. As to whether it is safe to resort to this method of treatment in placenta prævia in any but cases which call for treatment comparatively early in pregnancy, I am exceedingly doubtful, as, owing to the friable nature of the lower uterine segment in these cases, there must be a very grave risk, and such laceration would naturally give rise to very serious hæmorrhage. I think that everyone will agree that the instrument is one which, if improperly used, is by no means devoid of grave danger, and for this reason, in my opinion, it should only be employed by those accustomed to perform major obstetrical operations. The instrument requires to be very carefully inserted, and dilatation to be very slowly proceeded with, a careful watch being kept by the aid of one finger on the

cervix. When the cervix is felt to be in the least unduly stretched, dilatation should at once be desisted from for a short interval, and then resumed even more slowly and cautiously than before.

This caution is more than ever necessary if this method is adopted in any case before the cervix is taken up, because, under these circumstances there is a greater risk of extensive laceration, and for this reason it should only exceptionally be employed in such cases.

A further point which more especially concerns those of us who practice in the tropics, is that any instrument which can efficiently and satisfactorily replace Champetier de Ribes's and other forms of bags is sure to be much appreciated, these latter being a source of great expense and trouble owing to the fact that they so rapidly deteriorate in warm climates and can never be really relied upon.

My best thanks are due to Lieutenant-Colonel F. S. Peck, I.M.S., for his kind permission to publish the above cases.

On the Prognosis of Pregnancy in Patients with One Kidney, with Notes of an Unusually Complicated Case of Labour after Nephrectomy.*

By James Haig Ferguson, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E.,

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In recent years, owing to the brilliant and rapid advances of surgery, the operation of nephrectomy has become no uncommon procedure for various diseased conditions of the kidney. It follows that we as obstetricians will occasionally be confronted with the question: Should a woman with one kidney be advised to marry and run the risk of becoming a mother? I am assuming, of course, that the remaining kidney is healthy and equal to its duties in ordinary circumstances.

We know that during pregnancy in healthy women the kidneys undergo hypertrophic changes of a strictly physiological character so as to enable them to cope with the increased work they have to do. In the same way, as is well known, the one healthy kidney in the patient whose diseased kidney has been removed undergoes hypertrophy which probably began long before the nephrectomy was performed, the diseased kidney having in all likelihood been more or less functionless for a considerable time prior to operation.† If, in such a case, pregnancy should then supervene, further hypertrophy will be required to meet the necessary demands, and as, so to speak, all the patients eggs are now in one basket, any undue strain on this kidney will at once mean very serious renal insufficiency.

The case I am about to record shows that in a patient whose remaining kidney is healthy, and has had time to become sufficiently hypertrophied to perform the work of two, the strain of pregnancy can be fairly well borne, for although the patient developed albu-

* Read before the Edinburgh Obstetrical Society, December 12th, 1906.

† In one case recorded in the discussion on Mr. Twynam's paper on nephrectomy in pregnancy (*Lancet*, vol. i., 1898, p. 165), it is stated that after removal of one kidney in a man, for laceration, where all the work was thrown suddenly on the opposite organ, the amount of urine and urea became normal in four days' time.

minuria, and had a diminished excretion of urea, yet when she was put on proper treatment (though it was somewhat late in the day) the condition yielded fairly satisfactorily to appropriate remedies, and the kidney irritation tended to subside. In fact this patient with only one kidney had, on the whole, less severe albuminuria and less toxic disturbance than many albuminuric primigravidæ both of whose kidneys are known to be organically sound, though it is possible and indeed probable that in my patient's case the amount and virulence of the toxin or toxins she was manufacturing were comparatively insignificant. It is manifestly impossible to institute comparisons between different patients on this point.

The only other instance of which I have personally known where pregnancy occurred in a patient with one kidney was in the case of a lady who was married about two years ago after having had nephrectomy performed. Pregnancy shortly supervened, and she died, I understand, of eclampsia shortly after a premature labour.

One would, on the whole, I think, prefer, so far as one's limited knowledge goes, that patients who only possess one kidney, even though it is apparently a healthy one, should, if they marry at all, delay marriage till after the menopause. One could not, however, give such uncompromising advice; it would be impracticable, and indeed in many cases hardly justifiable, besides being highly unwelcome to many of the recipients. Each case would require to be judged on its own merits, and after a careful consideration of all the attendant circumstances. Some patients might be determined to take a certain extra risk for reasons all important to themselves, and such are apt to listen to no arguments which in any way run counter to their own views and inclinations. I should be strongly inclined to urge, in the interests of prudence, that marriage be delayed till at least three years from the operation of nephrectomy, so as to give the remaining healthy kidney ample time for compensatory changes to occur under the influences of the varying vicissitudes of ordinary life—in fact to establish and consolidate a condition of matters which will enable the one kidney safely and easily to do the work usually undertaken by two.

Of course if the remaining kidney were diseased, marriage, where there is any possibility of child-bearing, should in my opinion be out of the question.

Whenever a first pregnancy occurs in a patient with only one kidney, she should be most carefully watched, and placed in circumstances where this watching can be thoroughly and systematically carried out, her urine being examined and tested regularly during

the whole duration of pregnancy, with the view of immediately bringing the pregnancy to an end should she show any evidences of renal inadequacy which fail to respond to general treatment.

Special care should be taken to ensure that the excretion of urea is not diminished, and in this connexion it is well to remember that the excretion of urea in healthy, pregnant women, seems to be considerably less than is usually supposed, varying, according to Whitridge Williams, from 20 to 24 grammes in the 24 hours. I have certainly in some cases verified this observation, but was inclined to put it down to commencing failure of excretion, and diminishing power in the kidney function, in fact to commencing toxæmia. Be this as it may, there can be no doubt, as Marx has shown, that urea is always diminished in the toxæmia of pregnancy, and that this diminution is a much more valuable, and certainly an earlier indication, than either the presence of albumen or casts, both of which latter may be absent even in bad cases. If this were more generally recognized and acted on, there would, I feel sure, be fewer cases of eclampsia than we now have to deplore.

The same general principles would hold, as regards subsequent pregnancies, in the case of a parous woman who had been the subject of nephrectomy, always bearing in mind the fact that primigravidæ are more specially liable to the toxæmic disturbances which may be associated with pregnancy.

The same remarks might be applied in the case of a woman with one kidney functionless, as for example in hydronephrosis, or where only one kidney is diseased and the other healthy, as proved by Luy's separator or by catheterizing the ureters. In such cases of kidney disease it would be of great importance to discover the exact condition of each kidney, for in my opinion the prognosis as regards the supervention of pregnancy would be worse with two kidneys even slightly diseased, than where only one kidney is diseased (even considerably so) and the other healthy. The advantage one has in the case of the woman with only one kidney is that one knows exactly where one is as regards the condition of the remaining kidney, and can speak therefore with a more certain voice as regards probabilities and possibilities.

I have been unable to find much information in literature on this subject. There is a considerable number of cases recorded where, on account of urgent kidney complications, nephrectomy had to be performed during the actual existence of pregnancy, in many cases with satisfactory results both as regards the mother, the continuance of the pregnancy, and the health of the child.

Fritsch says that pregnancy can be carried through with nephrectomy of one side, and quotes a case of Bovée's in support of this. He says, however, that the remaining kidney, if it becomes in a higher degree a "pregnancy kidney," may easily become insufficient, and that this may lead at once to the most serious eclampsia. Schramm, quoted by Cumston, records a case where the right kidney had been removed and pregnancy and labour were practically normal. He sums up by saying that a patient having but one kidney may go through pregnancy and labour without any injury to her health, but it is probable that such a patient would have diminished resisting power should she be afflicted with chronic nephritis, and that an attack of eclampsia would be fatal to her. In other words, with good fortune, she may pass through her pregnancy and labour safely, but any breakdown will necessarily tend to be greater, and therefore apt to be more disastrous.

The variety of the complications which had to be dealt with in the following case was greater than I have ever before met with in any one patient, and the cases must be few in which so many obstetrical difficulties have been concentrated in one individual. For in addition to the fact that she had, some years previously, undergone the operation of nephrectomy, the patient was the subject of albuminuria, and had besides a contracted pelvis, placenta prævia, and a cervical polypus, whilst, in the way of obstetric operation, induction of labour, and craniotomy were required, and manual removal of an adherent placenta was necessary, in order to complete the third stage.

The notes of the case are as follows:—

F.K., æt. 36, a primigravida, was admitted to the Edinburgh Maternity Hospital at 9-30 p.m., on the 29th December of 1905.

The patient had last menstruated on the 20th of March 1905, and on admission it was noted that in spite of the fact of her being a primigravida, and in the last month of gestation, the fœtal head was not engaged in the pelvis, but was freely movable above the pelvic brim. The fœtus lay in the left occipito-anterior position.

The patient stated that she was quite well during her pregnancy till the end of October 1905, when her legs became so much swollen that she had to go to bed where she remained for a week. She had been liable to occasional severe headaches.

On December 28th, the day before her admission to Hospital, she was suddenly seized with severe headache, and flashes of light before her eyes, but she noticed no swelling of hands or face. On admission her urine, which was scanty, contained 2 grains of albumen and 4 grains of urea per fluid ounce. She was thin and very pale, and

there was considerable dropsy of the lower limbs, of the abdominal wall, and of the vulva.

When five years of age she had had scarlet fever, followed by nephritis. In February 1896, her left kidney was removed for tuberculous disease. The symptoms which led up to the nephrectomy and which had lasted for 12 months before the operation, were progressive emaciation, blood in the urine, frequency of micturition, night-sweats, and attacks of severe pain in the left lumbar region. She states that she recovered well from the operation, but that the wound did not heal for 12 months afterwards. Since then she has remained well. She has now no pain or discomfort on micturition, but passes water rather frequently—every two hours or so.

Menstruation began when she was 16 years of age, and recurs at intervals of 24 days. It is fairly profuse. She has no dysmenorrhœa or intermenstrual discharge.

Examination of the pelvis showed an intercristal diameter of $10\frac{1}{2}$ inches, and an interspinous diameter of $8\frac{3}{4}$ inches. The diagonal conjugate was fairly normal, just slightly under $4\frac{1}{2}$ inches. The pelvis was, however, much contracted transversely, and was of a kyphotic type.

The patient's general condition improved under milk diet and complete rest in bed. Her urine increased in quantity up to 50 to 60 fluid ounces per diem. The urea varied from $2\frac{1}{2}$ to 4 grains per fluid ounce, and the albumen decreased to 0·4 grains per fluid ounce.

In view mainly of the head not having entered the pelvis, it was decided to induce labour as there seemed some hope of getting the head through if it were not too firmly ossified. Accordingly a bougie was introduced into the uterus on the evening of January 3rd, 1906. There was some bleeding per vaginam after this, and this was at the time attributed to a small polypus which projected inwards from the left side of the cervical canal. There were occasional transient pains during the next twelve hours, and at the same time some further bleeding, not severe, but more than seemed to be accounted for by the cervical polypus. On careful examination after the os became patent, there was found to be a lateral placenta prævia with apparently a somewhat shrivelled placental lobe. The pains almost disappeared during the next 24 hours (even though the membranes had ruptured prematurely), and there was not much hæmorrhage. On the morning of the 5th of January, 1906, a Champetier de Ribes's bag was inserted through the os, which was about the size of a florin and very rigid. Strong pains came on during the day, and at 3 p.m. the patient was looking and feeling very much worn

out, her pulse being 118 to the minute. At 3-30 p.m. she was anæsthetized, the Champetier's bag was pulled slowly down so as to fully dilate the cervix, as well as to stretch the vagina and perinæum, the forceps was applied to the fœtal head, and every effort was made to effect delivery in this way. All such attempts, however, proved futile, as the head was too large and too firmly ossified to pass through the pelvic brim. I therefore performed craniotomy, and the child was even then with difficulty extracted, as both the cavity and outlet of the pelvis were likewise transversely contracted. The child was delivered at 4-25 p.m., it was a male, weighing 5 lbs. 13 ozs., and was 22 inches in length.

The placenta was retained, and after half an hour I inserted my hand into the uterus, found it completely adherent and verified the diagnosis of partial placenta prævia. After manually detaching and removing the placenta, an intra-uterine douche was given, and it was found necessary to insert three stitches into the perineum. The placenta showed a shrivelled lobe.

The puerperium was uneventful. The albumen steadily diminished and ultimately entirely disappeared, and the patient was discharged well on the twelfth day.

This case is mainly of interest from the fact of the patient having only one kidney with which to face the strain of her first pregnancy and labour. Clearly labour should have been induced at a much earlier date in order to have been of any service in giving the child a chance of life, but unfortunately the patient did not come under observation until too late for this operation to have been of any real advantage in the child's interests, and it was done therefore more for the mother's sake than from any great hope of saving the child.

It is to be noted that the patient had a history of nephritis after scarlet fever in childhood, from which she seems completely to have recovered at least in so far as the right kidney was concerned. Her left kidney was removed for tuberculous disease in 1896, nearly ten years before her confinement, so that during all these years she had manifestly been entirely dependent on the right kidney for all her renal functions. Fortunately this kidney proved to be healthy, and rose to the occasion most satisfactorily. But if it was equal to the work required of it in the non-gravid state, the strain implied by the occurrence of pregnancy and labour and the increased functional activity necessarily produced thereby set up a condition of relative insufficiency, which fortunately, however, did not go the length of

a complete breakdown. Had the pregnancy chanced to have been multiple, or had the toxæmia been greater, one could hardly have hoped for a favourable result.

REFERENCES.

In the *Handbuch der Geburtshülfe*, by von Winckel (Wiesbaden 1904), Zweiter Band, ii. Teil, page 1,432, practically all the references to kidney operations during pregnancy are given. The reference to Twynam's case is given erroneously under "Frymann."

Also "Pregnancy and labour following nephrectomy," by Baldwin. *Cleveland Medical Journal*, 1903, ii., page 213.

On the Radical Abdominal Operation for Uterine Cancer.

By E. T. Thring, F.R.C.S. (Eng.), etc.,

Surgeon to the Prince Alfred Hospital and to the Royal Hospital for Women, Sydney, New South Wales.

In a paper published in the *Intercolonial Medical Journal of Australia* eleven years ago,* I reviewed the position of the surgical treatment of uterine cancer, and discussed the unsatisfactory results of supravaginal amputation of the cervix uteri and of vaginal hysterectomy. The possibility of obtaining better results by means of a more thorough and radical operation was considered, and reasons were given for the conclusions arrived at. At that time I had no knowledge of any systematic operative procedure, having for its object the complete removal of the uterus with its appendages, together with the broad ligament and its contained lymph vessels as well as the nearest set of lymphatic glands into which the broad ligament lymphatics enter. Work on these lines was being done at or about the same time at the Johns Hopkins Hospital, and also, I believe, on the Continent of Europe.

In December 1895, I first put in practice the "radical operation" for carcinoma uteri which had been advocated by me on theoretical grounds in August of the same year. It was a case of epithelioma of the cervix uteri. The patient recovered. Microscopic examination of the pelvic glands removed showed that two of them were the seat of secondary cancerous deposits. The patient is at the present time alive and well. Three more cases were operated on in 1896 in a similar way; one of them, operated upon in the Royal Prince Alfred Hospital, Sydney, especially interested me. The patient, a young married woman aged thirty-three years, had a carcinomatous growth of the cervix, chiefly on the left side, not extending on to the vaginal wall. The uterus was freely movable, and the patient in good general health. Apparently the case was unusually favourable for a *vaginal* hysterectomy. The clinical diagnosis was confirmed by microscopic

* "Treatment of Uterine Cancer," *Intercolonial Quarterly Journal of Medicine and Surgery*," August 1895, vol. ii., no. 2, p. 120, Melbourne.

examination. The most careful bimanual examination showed no apparent extension of the disease beyond the uterus. The combined vagino-abdominal operation was performed, the uterus and its appendages, the broad ligament, the lymphatics, and the pelvic lymphatic glands being all removed. On the left side of the pelvis, three large glands and some smaller ones were removed, where they lay over the internal iliac vein and in the space formed by the bifurcation of the common iliac artery into its external and internal divisions. Microscopic examination showed that two of the larger glands were invaded by secondary carcinomatous deposit. Had the usual vaginal operation been done in this case these glands would never have been discovered, and certainly could not have been removed. This patient, to my knowledge, remained free from recurrence for three years, after that I lost sight of her. Had these glands been left *in situ* she could not have remained free for three years, and probably would not have been alive at the end of that time. Since 1896 I have never performed a vaginal hysterectomy.

I have records of fifty-two cases all treated in the manner described. As was to be expected the primary mortality at first was considerably higher than it became later on. The reasons for this were that with increased experience one altered and improved one's technique, and one also became better able to decide as to the cases in which any radical operation was inadvisable. The primary mortality rate of the first twenty-seven cases, was about 12 per cent.—the last twenty-five have all recovered, and this in spite of the fact that the ages of the patients ranged from thirty-two years to one of seventy years.

I can give no estimate as to the proportion of cases in which the radical operation was done, as compared with the total number of cases of carcinoma and sarcoma of the uterus which came under observation during the past ten years. Here as elsewhere the trouble is that so many patients are seen too late to justify a major operation. It is useless to attempt any radical operation, undertaken with the hope of cure, in cases in which the ureters, the rectum, the pelvic floor, and probably the bladder, are involved.

Although as regards the bladder I believe that, in some few cases where the posterior wall is only slightly invaded by new growth and that well away from the trigone, it is worth while excising the affected portion of the bladder wall and closing the wound by two layers of sutures. To operate in cases in which the tissues between the layers of the broad ligaments are infiltrated with new growth, and the ureters are surrounded by it, is bad surgery and utterly unjustifiable.

It is possible to excise the involved portions of the ureter, and implant the cut end into the fundus of the bladder—but in such a case there can be no hope for non-recurrence, and therefore the patient should not be exposed to the risks and troubles attendant upon such an operation. The same principle applies to all operations for carcinoma of the abdominal viscera, as for instance the stomach, or gall-bladder. I cannot give the percentage of permanent cures as judged by freedom from recurrence for five years or more, because of the absolute impossibility of keeping in touch with the patients for so long a time. I do, however, know of eight instances in which *pelvic glands showing secondary deposits of carcinoma* at the time of operation, and in which the five years' limit has been reached or passed. In no one of these instances would this have been possible had the glands not been removed.

It has been stated that the difficulties and dangers of the operation are such as to render it unjustifiable; with this conclusion, after having had ten years experience of it, I cannot agree. Difficult it certainly is sometimes, but given a thorough knowledge of the anatomy of the pelvis and of the arrangement and relations of the ureters and blood-vessels, a certainty of result can be attained. The whole field of operation is within sight as well as touch. The danger of injuring the ureters is far less than by the ordinary vaginal operation, or by that of para-vaginal section. In fact, the ureter may be freely exposed from the pelvic brim posteriorly, forward to its point of entry into the bladder, and in no case have I found any ill effect to result. The control of the blood-supply is absolute. The ovarian vessels are easily exposed and ligatured in the infundibulo-pelvic fold of peritoneum, and the uterine artery can be ligatured and divided. In three or four instances I have found it expedient to expose the internal iliac artery itself so as readily to permit an aneurism needle to be passed around it, the vessel itself being divided between two ligatures. The collateral circulation is so good that there are no ill effects even as regards the nutrition of the lower end of the ureter. One most important fact must be remembered in connexion with the ureters. From the point at which they cross the pelvic brim and lie against the side of the pelvis, internal to the great vessels, and beneath the peritoneum, they are more closely attached to the peritoneum than to the side of the pelvis. If the peritoneum is stripped the ureter comes with it, and must be gently detached by the finger, or handle of the scalpel. There is no need to injure the nutrient vessels which are easily seen running along and in close contact with the ureter. It is only when the internal iliac it-

self has been ligatured that I have seen any interference with the nutrition of the ureter at its lower end. In two such cases there was a slight leak of urine, commencing in each instance on the *fourth* day after operation, and ceasing entirely on the tenth and twelfth days respectively. In my later cases I have never found it necessary to ligature the internal iliac. The deep transverse pelvic vein which lies *below* the level of the ureter, and passes outwards and a little forwards, so differing in direction from the uterine artery, can be seen, picked up, and divided, or if divided first can be easily picked up, and this is always advisable, for otherwise much blood may be lost unnecessarily. If the position and relations of the blood-vessels be thus known and made use of, the operation becomes one of certainty and safety, and is comparatively bloodless, and certainly does not deserve the term " a ghastly dissection " which has been applied to it by a well-known English surgeon.

In order to extirpate the whole broad ligament with its contained lymphatic vessels a considerable amount of peritoneum is removed, extending from the brim of the pelvis downwards to the pelvic floor, but sufficient is always available to cover in the ureters.

I still prefer the vagino-abdominal method, to that entirely through the abdomen, especially in those cases where the carcinoma has encroached upon the vaginal wall. It enables one definitely to mark off with the scalpel the amount of vaginal wall to be removed, and facilitates the final steps of the operation from the abdomen. I have never found the præ-sacral glands involved, and only in one instance the inguinal glands. This was in a case of cancer of the body of uterus, where the lymphatics running along the round ligament of the affected side had formed the channel of infection. It is never necessary to introduce sounds into the ureter, for this means loss of time, and the safety of the ureters lies in the fact of their complete exposure.

Compared with the ordinary operation of vaginal hysterectomy or that of para-vaginal section, the operation I have advocated appears to me to be one of far greater precision and to be anatomically far more correct. In addition it gives a more complete command of the field of operation, and what to my mind is the most important fact of all, it enables the operator to follow the lymphatics up to the nearest lymphatic glands and to remove both. This latter procedure is absolutely impossible by the ordinary vaginal method or by that of para-vaginal section. The latter operation appears to be to have nothing whatever to commend it. It does violence anatomically from

start to finish, and should there be pelvic adhesions involving the intestine, the risk of damage to the gut must be very great, as it is quite impossible for the operator to see what he is doing.

The argument that, in a fairly large proportion of cases, the pelvic lymphatic glands are not involved by secondary deposits really tells against those who use it, for it is quite impossible in the vast majority of cases, to say, before operation, in any individual instance, whether the glands are or are not involved. The case I quoted at the commencement of this paper shows this. I have only in one instance been able to demonstrate before operating, an undoubted involvement of a pelvic gland by secondary deposit. In this case, the original cervical growth was a rapidly growing, fungating columnar-celled epithelioma, and on the left side of the pelvis there was a movable gland equal in size to a pigeon's egg. This, with other infected glands, was easily removed from within the abdomen. In some cases where the enlarged glands are lying upon and closely adherent to the sheath of the internal iliac vein, it behoves one to use the scalpel and dissecting forceps with great care. Still in no instance have I seen the vein wounded.

It has been raised as an objection that the abdominal wound predisposes to ventral hernia. In answer to this I would say that if the abdominal incision is properly made through one or other rectus, and sutured in layers, having due regard to the anatomy of the abdominal wall, the risk is so small as to be not worth consideration. In fact the operation, although sometimes difficult, as for instance in a very deep pelvis, or where there is a good deal of subcutaneous and abdominal fat, is far less dangerous to the ureters, bladder, rectum and intestines, than any vaginal or para-vaginal operation. In addition, it gives complete command of the blood supply, as well as access to the lymph vessels and glands which the other methods utterly fail to do. I am assuming, of course, that the operator really knows his pelvic anatomy.

Although I can only vouch for nine cases in which the pelvic glands were invaded by secondary deposits of new growth, and were removed, the patients remaining free from recurrence for periods varying from five and a half to ten years, this is sufficient to establish the soundness of the principle advocated, *i.e.*, that in dealing with carcinoma of any organ, it is not enough to remove only the actual new growth together with an area of apparently sound tissue surrounding it, but also to follow as completely as possible the efferent lymphatic vessels from the affected area, up to the group of lymphatic glands into which they open, and to remove these vessels and the

associated glands as completely as possible. This principle is recognized and acted upon in regard to cancerous growths of the breast, tongue, stomach and intestinal canal. Why should the uterus be made an exception? Of all the viscera, with the exception perhaps of the stomach and kidney, the uterus is most favourably placed for the carrying out of a radical operation. Most of the lymphatic vessels from both cervix and uterus are included in the area of tissue outlined for removal, as described above, and *most* of them empty into the pelvic lymphatic glands which are accessible and removable. Then as to the ureters, their safety so far from being imperilled is assured, provided the operator really knows his normal pelvic anatomy.

The primary mortality is not excessive, being very little if at all above that of vaginal hysterectomy, and the results, even as illustrated by the few cases I have mentioned, are impossible by any less thorough method.

In cases where the lumbar glands are involved by secondary deposit, I do not believe any major operation is justifiable. It means that things are too far advanced to permit of a reasonable hope of non-recurrence. The same rule applies to those cases in which the loose connective tissue at the base of the broad ligament and in close relationship to the ureter is involved. To perform a major operation in such a case, especially where it involves resection of one or both ureters is absolutely wrong, and simply means, even if the patient makes a primary recovery, a surgical performance which may afford gratification to the operator but is of no benefit to the patient. In such a case there is no hope of getting beyond the limits of the invading carcinoma and therefore no hope of *cure*.

Until we know far more than is at present known of the causation of cancer, the only treatment which holds out any hope of cure, is that by operation. That being so, it should surely be as thorough and radical as possible, having due regard to the resulting primary mortality rate, and to the remote results in the direction of duration of life (even where there is a recurrence), freedom from pain and discomfort, and permanent cure in a certain definite proportion of cases. The primary mortality rate may be placed very little, if at all, above that of vaginal hysterectomy.

The duration of life in those cases in which recurrence does take place I have found to be in most instances about three years; the exceptions being those of a very malignant type of new growth occurring in comparatively young patients whose ages varied from thirty-two to thirty-six years.

In the majority of cases in which recurrence took place there was a marked freedom from the fetor and hæmorrhage which are usually so distressing during the later months of uterine cancer.

The fact that in a fairly large proportion of instances patients whose pelvic lymphatic glands were at the time of operation already invaded by cancerous deposit, have, after removal of these glands, passed the five-year limit without recurrence, is sufficient to place the method here advocated far before the ordinary vaginal hysterectomy, or para-vaginal section, simply for the reason that had either of the latter methods been followed the pelvic lymphatic glands, which were already the seat of secondary deposit, would have been left behind. In every such case therefore the outside limit of life could not have been more than three years, and there could have been no hope of permanent freedom from recurrence.

SELECT CLINICAL REPORTS.

(Under this heading are recorded, singly or in groups, cases to which a special interest attaches either from their unusual character or from being, in a special sense, typical examples of their class).

I.

A Case of Villous Tumour of the Uterus in a Woman aged 84 years: Hysterectomy: Recovery.*

By J. Bland-Sutton, F.R.C.S.

A villous tumour of the uterus is, I think, very rare, and the interest of this report is increased from the fact that the patient is a multipara, 84 years of age. Except for a blood-stained vaginal discharge, this old lady seemed in perfect health, but the character of the discharge made those in charge of her suspect that she was the victim of cancer of the body of the uterus. In order to establish a diagnosis the uterus was curetted, and a microscopic examination of what came away caused the pathologist to pronounce the disease to be cancerous; but it was thought that the patient's advanced age contra-indicated a radical operation.

Dr. W. A. Milligan asked me to see the patient with a view to operation, for, notwithstanding her advanced age, she seemed to be thoroughly capable of bearing an operation, and especially as the uterus did not appear to be greatly enlarged. After careful consideration I performed vaginal hysterectomy in September, 1906, and the operation was followed by an uneventful and quick convalescence.

The uterus was hardened in formalin solution and bisected (see drawing) in its sagittal axis. The uterine cavity is filled with a soft, yellowish mass growing from the endometrium covering the posterior surface. Thin sections were cut in such a way as to involve the walls of the uterus and the growth; on microscopical examination we found that the free portion of the tumour consists of compound villous processes covered with columnar epithelium. Its resemblance to a villous tumour of the bladder is complete in every particular, except that the investing epithelium is identical with that covering the normal endometrium.

* Communicated to the Obstetrical Society of London, February 6th, 1907.

A uterus in sagittal section. The cavity is dilated and occupied by a villous tumour growing from the posterior wall. From a multipara, aged 84 years.

We critically examined the base of the tumour, and found it to consist of the peculiar cells which compose the reticulum of the normal endometrium; it does not infiltrate the subjacent muscular wall of the uterus. From the histologic standpoint it is clearly a non-malignant tumour.

Although I have devoted much attention to the histology of uterine tumours, I have only seen one other example of a villous tumour of the corporeal endometrium; this occurred in a multipara, aged 54 years, and I removed the uterus under the impression that it was cancerous, but in the laboratory Dr. Foulerton and myself have, after repeated examination of the sections, been unable to make up our minds on the question of malignancy. This operation was performed six years ago, and the woman remains in good health; it is therefore a fair assumption that a typical villous tumour of the uterus is not malign. Moreover, in this case the villi were long, slender and simple.

I believe that a typical villous tumour of the corporeal endometrium with compound villi is extremely rare.

II.

Complete Inversion of Uterus following Delivery; Sapræmia; Vaginal Hysterectomy.

By Walter Tate, M.D., F.R.C.P.,

Obstetric Physician to St. Thomas's Hospital.

M.A.J., aged 24 years, was admitted to St. Thomas's Hospital under my care, on the 1st of August, 1906. The patient's first confinement was difficult, and had to be completed with instruments. The second confinement was uneventful. The third confinement occurred on the 24th of July 1906, that is about one week before admission. Labour pains lasted only two or three hours, and the delivery of the child was very rapid, occurring before the arrival of the midwife. There was some delay in the delivery of the afterbirth and the midwife is said to have pulled on the cord. As the placenta did not come away, a doctor was called in, and on passing his hand into the uterus he found partial inversion. This was reduced and the placenta then removed. There was no sign of shock at this time, but the patient had had severe hæmorrhage after the birth of the child.

The hæmorrhage had continued up to the time of the patient's admission to the Hospital, and for a few days prior to admission the discharge had been very offensive as well as copious. On further examination by the doctor on the 31st of July, the uterus was found to be completely inverted, and on the following morning the patient was admitted to the Hospital. The temperature on the evening of the 31st of July was 104°F.

On arrival at the Hospital, the patient was seen to be exceedingly ill. She was profoundly anæmic, with a sallow, waxy complexion; the lips were absolutely blanched. The temperature was 101°, the pulse rate 150. The facial expression was anxious. Respiration was somewhat rapid and shallow, rate 32 per minute. The condition was such as one expects to meet with in cases of septic absorption following severe hæmorrhage. On examining the abdomen there was no superficial tenderness, but some pain was caused by deep pressure. The heart sounds at the apex had a fœtal rhythm, the first sound simulating the second sound more closely than the normal first sound. The vagina was occupied by a large tumour, equal in size to a cricket ball, which completely filled it. On passing the hand up a round,

thin mass, was felt; it was evident that the whole uterus—body and cervix—was completely inverted. There was no sign of any encircling ring at the top of the vagina. The whole surface of the inverted organ was rough and irregular, and emitted a highly offensive odour due to masses of placental tissue in a sloughing condition and adherent to the surface. On bimanual examination the cup-shaped depression formed by the inverted organ was readily felt; it permitted three fingers to be pressed into it.

As one felt firmly convinced on looking at the extremely grave, anæmic condition of the patient, that she had no power to withstand any further septic absorption from the septic uterus if it were left, it was decided to remove it at once per vaginam. Before doing this, an attempt was made under an anæsthetic to reduce the inversion, not with any intention of leaving it in the patient's body, but in order to facilitate the operation for its removal, and to avoid soiling the field of operation with the septic discharge from the decomposing surface of the mass. It was found impossible to replace the uterus after a steady trial, and as the uterine tissue was very soft and friable, it was not thought wise to prolong the attempt, and the operation of vaginal hysterectomy was at once proceeded with, the uterus being still inverted.

After cleansing the uterus as thoroughly as possible, it was wrapped round with a bandage of antiseptic gauze, and rubber gloves were used by the operator. There was no special difficulty about the operation. After incising the vaginal mucous membrane all round at the usual level in relation to the cervix, it was noticed that anteriorly one came at once on the peritoneum of the utero-vesical fold. Owing to the increased looseness of the cellular tissue between the bladder and cervix, the former became entirely separated from the latter when the uterus was inverted, so that the bladder was not seen at all during the operation. The uterine arteries were carefully secured on each side, and after incising the peritoneum anteriorly, the broad ligaments, with the Fallopian tubes and ovaries, were seen rising out of the cup-shaped cavity formed by the inverted uterus. The left ovary and both tubes were removed, the right ovary was left. The last attachment of the uterus to be divided was the peritoneum of the floor of Douglas's pouch. When the operation was finished, a plug of iodoform gauze was placed in the vagina. Very little hæmorrhage occurred during the operation, but while the patient was under anæsthesia 20 minims of sulphuric ether and 18 minims of liquor strychninæ were injected hypodermically, and an intravenous infusion of three pints of normal saline solution was administered, owing to the critical condition of the case.

At the conclusion of the operation after the patient had been put back to bed, and had had hot bottles to the surface and other restorative measures, her condition was distinctly better and the pulse rate fell to 110. This improvement was only of short duration, as in the evening the patient had a rigor with temperature 105°, and a rise of the pulse rate to 160.

At 4 a.m. on the morning following the operation, the patient suddenly felt very faint, and the pulse became imperceptible. Strychnine and morphia were injected hypodermically, and steady improvement followed. At 9 a.m. the temperature had fallen to 99·6°, though the pulse was still 160, small and very compressible. The patient, however, was distinctly better, and was taking her food well. During the day following the operation the temperature steadily rose, and at night it was 104°. There was some delirium. After tepid sponging, the patient improved and her condition the following morning was very encouraging. The vaginal plug was removed on the third day. From the third to the sixth day the temperature fluctuated between 100° and 102°, and the pulse rate fell to 130. From the seventh to the tenth day there was a further fall in the temperature which ranged between 99° and 101°. The amount of vaginal discharge steadily decreased. By the twelfth day after the operation the pulse rate had dropped to 100 or thereabouts, the temperature was normal, and the patient had regained a certain amount of colour and had quite lost the sallow, earthy complexion, that was present when she was first seen. From this time on she made a steady and uninterrupted recovery.

The patient was seen on the 2nd of February, 1907, and she then expressed herself as feeling better than she had done for years. She had had no unpleasant symptoms following the removal of the uterus and the consequent stoppage of the menses. For part of one day when the period would have been due she had had a little pain over the lower part of the abdomen, but this had been much less than used to occur when she had her ordinary periods.

Remarks. The case just recorded is an interesting example of complete inversion of the puerperal uterus complicated with septic infection. The septic condition of the uterus was a very serious factor in the case and was largely responsible for the surgical treatment adopted. It is probable that the partial inversion, which was observed by the medical attendant immediately after the delivery of the child when the hand was introduced to separate the placenta, and which was subsequently reduced by him, recurred very shortly after-

wards, owing to an atonic condition of the placental site. This partial inversion afterwards became gradually converted into a complete inversion by the active contractions of the uterus. Portions of placental tissue which were still adherent to the inner surface of the uterus, became decomposed and gave rise to sapræmic symptoms, but it was not until the discharge had become highly offensive that a further internal examination was made and the actual condition determined. If the patient had been seen a few days earlier, before the septic symptoms had shown themselves, the inversion would probably have been reduced without difficulty and any portions of adherent placental tissue removed. When the patient was admitted to the hospital she was in a very critical state as a result of severe hæmorrhage at the time of delivery and after, and she was also suffering from septic absorption. The first question that suggested itself was whether the patient had a fair chance of recovery with the uterus in the condition described above, if the organ were replaced and the adherent portions of placenta removed. The next point to decide was, whether, supposing one came to the conclusion that the case would almost certainly terminate fatally if the uterus were left *in situ*, the condition of the patient admitted of such an operation as vaginal hysterectomy. It is impossible to prognosticate with certainty in septic cases. It will be generally admitted, however, that in a patient, exhausted by hæmorrhage, the power of resistance to septic poisoning is greatly diminished. It is highly probable that even if one had succeeded in replacing the uterus and in removing the sloughing portion of placental tissue, infection of the thrombi in the uterine wall would have taken place, and the case would have terminated fatally. Taking this view of the probable course of the case if treated by conservative methods, one felt justified in recommending vaginal hysterectomy, by which means the local source of infection would be completely eradicated. Vaginal hysterectomy performed during the puerperium is a comparatively simple operation, and where care is taken to avoid hæmorrhage and the operation is not unduly prolonged, it is rarely followed by shock. The rigor and rise of temperature which occurred on the night after the operation were not unexpected, as they almost invariably follow any interference with a septic focus in the uterus. After the temporary exacerbation caused by the extra dose of septic absorption resulting from the operation, the temperature gradually fell and the patient made steady progress.

In my opinion nothing short of vaginal hysterectomy would in this case have saved the life of the patient.

III.

Rupture of the Vaginal Wall with Protrusion of Small Intestine in a Woman 63 years of age; Replacement, Suture, Recovery.*

By Andrew N. McGregor, M.D., F.F.P.S.G.,
Assistant Surgeon to the Royal Infirmary, Glasgow.

Mrs. B., aged 63, was admitted into the Glasgow Royal Infirmary on the 23rd of October, 1906, suffering from a protrusion of intestine through the vulva, of three days' duration.

The patient gave the following history of the accident. On the 18th of October, she was carrying half a ton of coals into the house, when she "heard something give way." On the 19th, she felt out of sorts and took some whisky. That night, in trying to get out of bed, she fell across the back of a chair, astride, and sustained a severe blow on the perineum. She then observed a small quantity of blood coming from the vagina, and, on rising the following morning, became aware of a mass protruding from the vaginal orifice. She tried to press the mass back, but failed. On Monday the 22nd, she called in a doctor—Dr. Kirkland of Airdrie—who advised her removal to hospital.

On admission, her temperature was 98°F.; the pulse rate was 96 per minute, and of moderate tension. A mass of bowel was seen protruding from the vagina. It was covered with a fibrinous exudate and the coils were adherent. A whitish, foul-smelling discharge lay in the sulci between the folds of intestine and in the vagina. There were no visible wounds or bruises of the thighs, perineum, or vulva. A slight amount of tenderness and some distension of the lower part of the abdomen were observed. There were no signs of intestinal obstruction.

The patient had borne 10 children, but had had no prolapse or trouble of any kind with her uterus or vagina.

She was anæsthetized by chloroform, and a more thorough examination of the parts then revealed the presence of a tear in the vagina. The long axis of the wound lay transversely across the posterior wall of the vagina immediately behind the cervix, and was more extensive on the right side than on the left. The adhesions between the folds of bowel were separated, and the bowel was care-

* Communicated to the Glasgow Pathological and Clinical Society, January 14th, 1907.

fully washed in saline solution before being replaced into the pouch of Douglas. The vagina was also carefully cleansed and the wound in its posterior wall sutured, from left to right, for about two-thirds of its extent. The remainder of the opening was packed with iodoform gauze, and the vagina was filled with a similar material. The extent of the extruded bowel was about 18 inches, and its bulk was so great before operation that urine must have passed over it during micturition. The edges of the wound presented a torn appearance.

On the day after the operation it was noted that the temperature had risen to 101·2°F. and the pulse to 108. The whole abdomen was somewhat swollen and tender. The vaginal packing was removed and found saturated with pus. Fresh packing was introduced. The urine was drawn off by catheter.

The vaginal dressing was again changed on the third day, and thereafter, the dressing was removed daily until the twelfth day. The plug of gauze was removed from the wound on the seventh day and a douche of hot boric solution was administered daily at each change of the vaginal packing. The bowels acted in response to enemata 48 hours after the operation, and during the ensuing two days there was some diarrhœa. The temperature averaged 99·8°F. during the first 12 days and then declined to normal in two days after the discontinuance of the vaginal packing. On the 16th day it was noted that the wound was entirely healed and that there was no vaginal tenderness except over the scar. There was still a slight leucorrhœa. The patient was allowed up on the 18th day and left the hospital three days later.

Although rupture of the vagina with protrusion of the intestines as an accident of childbirth has been followed by recovery in a number of cases, there are points of special interest in this case, notably those of causation and treatment.

In the first place the mechanism of the injury is somewhat obscure. Rupture of the vagina in the great majority of cases occurs during pregnancy and parturition, and the reported cases may be classified into the following groups according to their causation:—

1. *During pregnancy and parturition.*
   (*a*) The "spontaneous" variety.
   (*b*) Direct injury by the advancing fœtus.
   (*c*) Laceration by instruments or manipulation.

2. *Apart from pregnancy.*
   (*a*) During coïtus
   (*b*) Direct injury by instruments and foreign bodies.
   (*c*) During replacement of malpositions of the uterus.
   (*d*) By the upward growth of fibroid or ovarian tumours.
   (*e*) By indirect violence (?).

The cases included in class 1—during pregnancy and parturition—though occurring under conditions which do not directly apply to this case, are worthy of consideration in so far as their causes are concerned. In particular that variety called " spontaneous " rupture of the vagina has led to the enunciation of theories which are interesting and which may contribute something towards the elucidation of the mechanism of indirect ruptures of the vagina.

The word "spontaneous" was applied to ruptures occurring during pregnancy, to indicate the absence of direct injury such as might occur during parturition. Amongst the earlier writers on the subject is Dr. R. Doherty. He relates the case of a woman of 36 years who had a fatal rupture of the vagina during the last months of pregnancy before labour had begun (*Dublin Journ. of Med. Science*, 1845, vol. xxvii., pp. 325—356). The tear corresponded to the right iliopectineal line, which, however, was not unusually sharp. The peritoneum was not torn but death resulted from hæmorrhage. There had been seven previous pregnancies; the pelvis was contracted; the fourth labour had been complicated by a funis and foot presentation, delivery being effected by perforation of the head and the use of the crotchet. Dr. Doherty believed that the predisposing cause was an unhealthy state of the vagina as the result of that difficult labour, and that the direct cause was the turning of the patient in bed, inducing a change of position of the uterus.

Wiltshire reports a case of spontaneous rupture of the vagina (*Trans. Obstet. Society*, London, 1876, vol. xvii., p. 362) in a woman of 38, who had previously borne nine children. When seen after labour had been in progress 18 hours the right arm and leg presented, and there was a laceration of the vagina, large enough to admit three fingers, just behind and to the right of the cervix. The promontory of the sacrum was found to jut out into the brim of the pelvis. There was little hæmorrhage; the bowel could be felt through the tear, but no blood-clots. The patient recovered without direct treatment of the tear. Wiltshire gives the cause as threefold, viz., (*a*) the undue projection of the sacrum, (*b*) the malposition of the fœtus, (*c*) and the violent efforts of the patient to effect delivery. Wiltshire quotes

Ingleby (*Obstetric Med.*, p. 177) to the effect that a want of correspondence between the uterine and vaginal axes is a cause of laceration during parturition. M'Clintock says (*Dublin Quarterly Journal of Med. Science*, May 1866): "It is worthy of notice that in nearly all the cases of spontaneous laceration the direction of the tear was more circular than longitudinal," and Wiltshire definitely states that circular tears occurring just behind the cervix are due to "spontaneous" rupture.

Cases are on record, notably that reported by Henry (*Lancet*, 1857, vol. ii., p. 325), in which the laceration of the vagina was so great that the fœtus was found in the peritoneal cavity. The child was delivered along with the placenta, membranes, and some large clots, and the mother recovered in a few weeks after some peritonitis. In contrast to these complete ruptures into peritoneal cavity there are cases noted in which the rupture was extraperitoneal, and it is probable that many small lacerations escape notice.

The question naturally arises as to whether this patient, during her ten pregnancies and deliveries, had experienced a partial rupture of the vagina, the scar of which gave way at the time of the accident. The patient, however, does not admit that any difficulties were experienced in her labours, and there is no pelvic deformity, such as those noted above, which would interfere with the normal course of labour. For similar reasons we are able to exclude partial rupture from the other causes such as laceration by the fœtus or by instruments, and there is no evidence of inflammatory or malignant disease which would diminish the strength of the vaginal wall.

Considering the causes of rupture of the vagina apart from pregnancy, the possibility of coïtus or criminal assault was suggested. The patient denied the possibility of either of these, and no evidence of such causes was obtained by Dr. Kirkland, who first saw her after the accident, and who, subsequently, after her return home, investigated this matter. Direct injury by a foreign body must also be excluded unless one admits the possibility of a part of the chair, across which she fell, entering the vagina and causing a tear at its upper and posterior limit without bruising or tearing the perineum, vulva, or other part of the vagina than that torn.

Some cases are recorded in which rupture of the vagina was due to replacement of a displaced uterus. That recorded by Fehling is perhaps the most striking (*Archiv für Gynäk.*, Berlin, 1873–4, vol. vi., p. 103, and *Brit. and Foreign Med. Chir. Review*, 1872–74, p. 513). He was called to a woman, æt. 63, who had suffered from prolapse for 30 years. Some hours previous to his visit, as she was carrying a pail of water

up some steps, the womb prolapsed. She tried to replace it and used some force. She felt something give way and the intestine protruded. Dr. Fehling found the intestine protruding through the vulvar orifice, the mass being as large as a man's head. The rent was found in the posterior vaginal wall, and an unsuccessful attempt made to replace the bowel. Puncture was tried, with no good result, and the patient died in 11 hours after the accident. Post mortem there was no sign of peritoneal inflammation. Dr. Fehling could find no previously recorded similar case. Dr. Gaillard Thomas had a case where the vagina was ruptured during an attempt to restore an inverted uterus (Schroeder, in *von Ziemssen's Cyclopædia of Medicine*, vol. x., pp. 220–1).

In the present instance the patient has had no prolapse of or interference with the uterus. Fehling's case shows that the vagino-peritoneal partition may be very easily ruptured since the force that a woman could employ in the act of replacing her uterus was sufficient to tear it.

Schroeder (*loco cit.*) states that the upward growth of ovarian or fibroid tumours may cause rupture of the cervix in the unimpregnated uterus, and he also says that Gotthardt met with a case of rupture of the vagina due to a fall. There is no tumour formation in the present case, but there is the history of a fall.

Referring to the story of the accident it is evident that there were two occurrences, for on the 18th of October she carried half a ton of coals into the house and "heard something give way," and on the following day she felt out of sorts and took some whisky, and later fell out of bed astride a chair and sustained a blow on the perineum. The sensation experienced during the work of carrying coals may have been due to the occurrence of a prolapse of the uterus, and the subsequent discomfort to that malposition. It is unlikely that the vagina had been ruptured else there would have been a history of hæmorrhage or of bowel protrusion. It was not till after the fall out of bed, if the story be correct, that the protrusion of bowel occurred. Theoretically that blow on the perineum should have accentuated the prolapse of the uterus, but, if the tear was due to that cause the uterus must have returned to its position for the bowel filled the vagina. The evidence in the case seems to indicate that the rupture was due to indirect violence and a review of the cases cited gives support to that view.

The second point of interest is that of treatment. The three courses which suggested themselves were:—(1) Excision of the pro-

jecting mass and return of the stump through the wound. (2) Replacement of the prolapsed bowel. (4) Abdominal section.

The first alternative was rejected because of the difficulty of access to the non-contaminated bowel and the necessity for its being drawn into the vagina during the operation. This would have extended the area of infection. Then, too, a resection of bowel in a patient suffering from profound shock induced by a three days' exposure of bowel was hardly likely to have been successful.

It was felt that the second plan was the most feasible for the reason that the lapse of time had been sufficient to allow of the formation of adhesions, and of omental protection taking place, so as to shut off the pouch of Douglas from the general peritoneal cavity. There remained, however, the difficulty of cleansing as well as that of returning the bowel to the pouch of Douglas. The adherent loops of bowel were separated and washed with saline solution. The vagina was douched gently with a similar lotion, and thereafter a careful palpation revealed the position of the tear.

Gentle traction was made on the bowel at its point of emergence through the wound so that another inch or so escaped, and, as there was no evidence of strangulation or gangrene, the whole mass was systematically replaced. During its manipulation the bowel diminished in size considerably with the accompaniment of a gurgling sound.

The cervix was caught with a volsella and held downwards and forwards so as to facilitate the insertion of the sutures. This stage was accomplished without much difficulty. Complete closure of the wound was not attempted, a gap amounting to about a third of its extent being left for the insertion of a loose gauze drain. The uterus was released; the vagina was swabbed dry and filled with iodoform gauze.

The third course might have been necessary had it been found impossible to return the bowel without the aid of a hand in the abdomen. Theoretically it seems to offer a better chance of success than the method of puncture tried by Fehling (loco cit.) the disadvantage being the separation of adhesions and perhaps the removal of a protecting omental adhesion.

A review of the history of this patient and of the records of published cases of rupture of the vagina in which recovery took place without suture of the tear seem to show that the good results are due to the isolation of Douglas's pouch. This factor is therefore an important consideration in the choice of an operation where there is evidence of bowel contamination.

In conclusion this case may be summarized as one in which a rupture of the vagina occurred in the position where the so-called "spontaneous" ruptures, which happen during pregnancy, are situated. The patient was a multiparous woman without any history of uterine or vaginal trouble. She was aged; the uterus was normal; and there were no tumours of that organ or its adnexa. The predisposing cause was possibly an undue thinness of the posterior vaginal wall. A prolapse of the uterus probably occurred during the heavy work of carrying the coal, and the fall during the night may have produced the rupture either owing to the undue mobility of the uterus or to the altered intra-abdominal tension and the weakened vaginal wall. The reposition of the protruded bowel was undertaken as the only obvious course, and the success of this proceeding was presumably due to the prior formation of protective adhesions, shutting off the pouch of Douglas and its contents from the general peritoneal cavity. It is remarkable that a woman of 63 years of age should have had sufficient vitality to withstand the shock of the protrusion of 18 inches of bowel through a tear in her vagina, should survive the shock of the replacement, and should escape without a general septic peritonitis.

Nearly three months after the accident, the patient was examined by Dr. J. K. Kelly, who reported to me as follows:—"I have just examined Mrs. B., and have to report that I find the condition of the genital organs normally senile. The only abnormality is a linear scar in the posterior vaginal fornix. There is no tumour in Douglas's pouch to indicate abnormal adhesions there. From the condition of the parts I consider that the cause of the rupture for which you operated must have been some direct violence and not a mere increase, however sudden, of the intra-abdominal pressure."

IV.

Case of Patent Urachus over One Inch in diameter forming a Tubular Prolongation of the Bladder.*

By G. Balfour Marshall, M.D., F.F.P.S.G.,

Gynæcologist to the Glasgow Royal Infirmary.

Mrs. M., aged 43, was admitted to the Glasgow Royal Infirmary in July 1906. She had suffered much discomfort from a complete procidentia uteri, and as mechanical appliances had failed to retain the uterus it was decided to perform a ventrofixation and colpoperineoplasty. While making the short incision midway between pubes and umbilicus, the subperitoneal fat was found to be very abundant, and this was divided as usual between two pairs of forceps until a small opening appeared in what I took to be the peritoneum. A pair of scissors was now used to enlarge this opening first upwards and then downwards. On lifting up the retroflexed uterus to the abdominal opening and thus compressing the urinary bladder, an escape of some clear fluid into the lower part of the wound aroused suspicions that something unusual had occurred, and led to a bougie being introduced into the bladder through the urethra. This instrument passed into the abdomen through a large opening.

At first I thought that in some unaccountable manner the bladder had been wounded, but an examination of the edges of the opening at the lower angle of the wound through which the bougie had passed showed only a thin fibrous-walled sac lying subperitoneally. It was now evident that what I took to be peritoneum (when the subperitoneal fat was cut through) was the wall of a patent urachus. The blade of the scissors had been introduced through an opening in the anterior wall of the urachus, and the first cut upwards had slit through the upper blind end and peritoneum into the abdominal cavity. The scissors, on being re-introduced to cut downwards, had now included peritoneum and both walls of the urachus, so that the latter was completely laid open obliquely. Had the patent urachus lain more in the median line instead of inclining to the right, and also been a little longer, the scissors might probably have only split the anterior wall, and the finger might thus have passed into its cavity instead of into the abdomen.

* Communicated to the Glasgow Obstetrical and Gynæcological Society, December 19, 1906.

The urachus is normally seen as a fibrous cord lying underneath the peritoneum, and extending from the fundus of the urinary bladder to the umbilicus. It is an embryonic remnant, and represents the obliterated upper portion of the duct of the allantois, which in the human embryo grows along the mesodermic structure known as the abdominal pedicle.

Occasionally it remains patulous, forming a tubular prolongation of the bladder which in this case extended to more than half way to the umbilicus and admitted three fingers easily. Rarely it is patulous throughout its whole extent, leading to an umbilical fistula. It has a thin outer fibrous wall, lined on its inner aspect by epithelium, and no muscle fibres exist except at the lower end, where they are derived from the muscular wall of the bladder. It will thus be understood how readily a patulous urachus can be opened without recognizing its presence, as its thin fibrous wall lying in the subperitoneal fat in the line of the usual mesial incision would be mistaken for peritoneum.

Should the urachus remain patent but be occluded at both the umbilical and vesical ends, it may become converted into a retention cyst. A number of such cysts are recorded in surgical literature,* many of them being mistaken for ovarian cystomata and their nature only discovered at operation. In one instance recorded by Reed (*Text Book of Gynæcology*, 1901, p. 805) a large cyst was formed, extending from the pubes nearly to the sternum.

The treatment adopted in the present case was, after enlarging the abdominal wound downwards, to dissect out and remove the urachus as far as its connexion with the bladder. As already stated it was found patent enough to admit three fingers (about $1\frac{1}{4}$ inches in diameter), thus forming a large opening into the conical-shaped fundus of the bladder. This opening was closed by a double layer of continuous catgut sutures, after which the uterus was fixed to the abdominal wall as originally intended and the whole abdominal wound closed.

A catheter was kept in the bladder for a week, and after its withdrawal the patient was able to retain her urine for the usual time, and suffered from no urinary discomfort.

* See reference to Weiser's monograph on Cysts of the Urachus in the *Journal of Obstetrics and Gynæcology of the British Empire*, vol. xi. p. 191, February, 1907.

From La Presse Médicale.

PIERRE BUDIN.

Obituary.

PIERRE BUDIN.

Pierre Budin was of humble origin, and was born at Enancourt-le-sec, Vexin, in November 1846. He began his medical studies in 1867. He was nominated a hospital "externe" at the end of his second year, and as a result of the "concours" at the end of 1871 he became "interne." From the beginning of his internat he resolved to take up obstetrics as his special study, and began to work by the side of, and under the direction of, Professor Tarnier. He graduated M.D. in 1876, and became "chef-de-clinique" in 1878. In 1880 he was nominated "Professeur agrégé." In 1882 the "Assistance publique" decided to create four hospital accoucheurs, and at a "concours" to fill these posts Budin obtained the first place. From 1882 to 1895 he was in charge of the midwifery service at the Charité Hospital. In 1895 he passed to the maternity; and in 1898 he succeeded Tarnier as Professor of Midwifery in the Faculty of Medicine of the University of Paris. He was elected a member of the French Academy of Medicine in 1889. He was chosen a "corresponding Fellow" of the Obstetrical Society of London in 1876: a meaningless title which was replaced in 1899 by the high distinction of being made one of the ten foreign subjects whom the rules of that Society allow as its Honorary Fellows. He was attached to many other societies, in France and elsewhere, too numerous to name: for his interests were wide and his reputation was extensive. His first original work was that in which he demonstrated the advantage to the child of delaying ligature of the cord until it had ceased pulsating. His thesis for his doctor's degree in 1876 dealt with the mensuration of the fœtal head and its moulding during delivery. In his thesis of agregation he studied the traumatisms of women during parturition.

Budin's illustrious and beloved master, Professor Tarnier, brought out, in 1882, in collaboration with Chantreuil, the first volume of a treatise on midwifery, which described most fully and carefully the anatomy and physiology of the genital organs, normal pregnancy, labour, lying-in, and infantile life. In the preparation of the second volume, which treats of the pathology of pregnancy, Tarnier chose

Budin as his helper, and this volume appeared in 1886. The work was completed in two further volumes, published after Tarnier's death. In these Budin was assisted by some other eminent French obstetricians. This book holds its place as one of the fullest and most trustworthy authorities on the subject that we have. In 1904 Budin in collaboration with Dr. Demelin published a résumé of the larger work and of his work entitled "Le nourrisson" under the title "Manuel pratique d'accouchements et d'allaitement."

The work to which the last twelve or more years of his life were given, was the diminution of infantile mortality. He founded in 1892 in Paris, weekly "consultations des nourrissons." In later years similar "consultations" were established by him in many provincial centres. At these "consultations" mothers were instructed to bring their babies, to have them weighed and examined, and to have records kept as to their food and other important matters. Under the auspices of M. Waldeck-Rousseau, Budin founded a league against infantile mortality, the object of which was to fight by all means, by lectures, publications, and practical help, against the ignorance and misery which carry off so many young lives. His last days were spent at Marseilles, whither he went to supervise the establishment of "consultations" for nursing mothers. There he contracted influenzal pneumonia, which proved fatal on January 22nd last.

Budin's great work was the organization of obstetrical teaching in Paris, and the establishment of the league against infantile mortality. He was a man of slight physique, but great power of work and strength of will. He was a diagnostician rather than an operator. He was fond of his profession, courteous and loyal to his friends and colleagues, and beloved by his pupils, among whom he insisted upon strict discipline. He is a loss not only to France, but to medical science all over the world.

G. E. H.

REVIEW OF CURRENT LITERATURE.

OBSTETRIC OPERATIONS.

Bloody Methods of Rapid Dilatation: Cervical Incisions: Vaginal Cæsarean Section.

Holmes (Rudolph Wieser). *Surgery, Gynæcology and Obstetrics*, December, 1906.—The author first deals historically with the operations of cervical incisions and vaginal Cæsarean section. Dührssen's name is associated with both operations. Cervical incisions were practised long ago, but in 1890 Dührssen perfected the technique and widened the indications. Holmes claims to have further modified the technique in 1901. In regard to vaginal Cæsarean section, the term was in use at the beginning of the nineteenth century, as Baudelocque deprecated dividing Cæsarean sections into abdominal and vaginal. In April, 1895, Dührssen suggested the operation, but did not perform it until April, 1896. In July, 1895, Acconci, an Italian, performed the first operation of the kind upon a woman seven months pregnant, with a carcinomatous cervix. After delivery he did a vaginal hysterectomy. As Holmes says, "*each independently applied old principles to new indications, and both are equally entitled to full credit.*"

The operation of cervical incisions presupposes labour for a more or less protracted period, while that of vaginal Cæsarean section is an elective procedure in pregnancy and labour.

The following conditions are laid down:—

1. *Cephalo-pelvic relation.* Dührssen says that either operation is appropriate in minor degrees of contraction of the pelvis, as the obstruction depends more upon the resistance of the soft parts than upon the pelvic obstruction. He places the conjugata vera at 8cm. as the lowest indication for a vaginal Cæsarean section. Holmes does not agree with this.

2. *Mobility of the uterus.* If the uterus cannot be drawn down, the operation of vaginal Cæsarean section will be very difficult to perform, but in such a case cervical incisions can easily be made.

3. *Engagement.* In a case appropriate for cervical incisions the presenting part should be engaged. This limitation does not concern vaginal Cæsarean section, in fact it is against it, as version is the operation of election for delivery.

4. *Cervical effacement.* Karl Braun has clearly shown that cervical incisions are only permissible when the cervix is taken up. On the other hand, if the cervix is not taken up and immediate delivery is required, vaginal Cæsarean section is the operation of election.

Indications.

The author says that during the last five years, in the hands of some operators, vaginal Cæsarean section has entirely superseded the more conservative operation of incisions. He deprecates the enthusiasm of those who maintain there is only one method of rapid dilatation of the os. He says, "As all roads supposedly lead to Rome, so bag-therapy (*sic*), manual dilatation, Bossi's or other instrumental measures, cervical incisions, and

finally, vaginal Cæsarean section, all have their due place in our operative preparation of the parturient os for delivery." With Pozzi, he recognizes that vaginal Cæsarean section is the great surgical achievement of the nineteenth century, but it is yet in an experimental stage as regards certain indications, and there are many cases in which more conservative manipulations will produce as good results with less risk.

He classifies the indications as (*a*) essential—various forms of cervical rigidity; and (*b*) contributory—complications of labour.

Essential Indications.

(*a*) *Simple rigidity.* According to Dührssen, rigidity *per se* will seldom call for vaginal section. In nearly all instances there will be a contributory indication.

(*b*) *Rigidity due to scars* as the result of sloughing or after amputation of the cervix.

(*c*) *Faulty dilatation*, caused by aberrant mechanism of labour, abnormal positions and premature rupture of membranes. In such cases the hystereurynter should be used.

(*d*) *Cervical displacements*, due to various operations for the correction of uterine displacements, incarceration of the retroflexed uterus, tumours of or in the pelvis. The operation has been done on cases of vaginal fixation. In a case of dystocia after ventro-fixation abdominal Cæsarean section would be the preferable operation; the same may be said of cases of tumours.

(*e*) *Carcinoma.* If the disease is limited, a vaginal Cæsarean section should be done, with removal of the uterus regardless of the child, but if the disease is advanced, palliative treatment should be adopted, and the pregnancy allowed to go on as far as possible in the interest of the child. In such a case abdominal Cæsarean section would be preferable.

Fibroids. In such cases the abdominal route is preferable, although Dührssen advocates the vaginal route in certain cases.

Contributory Indications—Complications of Labour—Maternal and Fœtal.

(*a*) *Eclampsia.* The author states that the present trend of the treatment of eclampsia is towards operative immediate delivery. He believes that Dührssen has truth in the statement, "They (women in eclampsia) die of the combination of a severe illness and the injuries produced," but he does not believe that vaginal Cæsarean section gives more happy results than the other methods of forcible delivery. He gives statistics collected from various sources which show that "all forced deliveries are inimical to the mother. As far as one may now ascertain, the different methods, in the hands of experts, offer relatively the same results, and probably produce approximately the same proportion of injuries. The lethal factor lies in the grave toxæmia, and to a slight extent in the operative delivery."

(*b*) *Placenta prævia.* The author condemns vaginal Cæsarean section in no unmeasured terms, and says, "I am convinced that the results in vaginal section for placenta prævia will be as bad as or worse than the typical operation for this condition—and more babies will be destroyed."

(*c*) *Ablatio placentæ; premature detachment of the abnormally situated placenta.* Dührssen claims that vaginal Cæsarean section is the recognized operation for this condition, but the author denies this. In 9 of these cases the author has never seen one in which the cervix was not quite soft and easily dilated, and he considers that, if the cervix were rigid, it is more than probable a good result would follow abdominal section.

(*d*) *Other dangerous maternal complications.* Vaginal Cæsarean

section may be called for in such complications as heart disease, pyelonephrosis, chorea gravidarum, pernicious vomiting of pregnancy, etc.

Fœtal Indications.

The author has only found one recorded case of vaginal Cæsarean section for a fœtal complication—a prolapse of the cord with an uneffaced cervix. Bumm was the operator, and mother and child were saved. The author does not approve of the operation for such a condition. In a moribund patient consent for a vaginal Cæsarean section may be more easily obtained than for an abdominal one, but the outcome for the fœtus will probably not be so good.

The author gives a very full description of the operation, and indicates the difficulties which may arise and how they may be dealt with. In his conclusions he states that "the most approved technique includes the anterior and posterior incisions, version, immediate removal of the placenta, repair, with tamponade if necessary. Vaginal Cæsarean section demands hospital facilities, if it is to be done rightly." The dangers of the operation comprise injuries to the bladder and to the uterus, and hæmorrhage both from the incision and from uterine atony. He also states that in subsequent labours there may be dystocia from cicatricial contraction of the scar, or rupture may occur. ROBERT JARDINE.

The Bloodless Methods of Artificial Dilatation of the Cervix at Full-term.

LEWIS (HENRY F.). *Surgery, Gynæcology and Obstetrics*, December, 1906.—The author divides the methods of what he terms bloodless dilatation of the cervix uteri at term into three groups—(1) the manual method, (2) the method by bags, (3) the method by metallic dilators.

He says that the manual method was practised by Guillaume and Louise Bourgeoise in cases of eclampsia and placenta prævia. This method was essentially that of Celsus. Philander Harris, he says, perfected this method 22 years ago. By American authors the method is generally spoken of as Harris's. The chief danger is the risk of infection as the hand has to be changed several times. He considers the danger of laceration is only slight, and says that in a few instances Harris has lacerated the tissues appreciably. He quotes Williams as a strong advocate of manual dilatation, and gives some of Williams's statistics. He states that in 87 cases there were 3 deaths due directly to the operation; but makes no reference to the number of cases in which the cervix was deeply torn, *e.g.*, in 50 per cent. of the cases of placenta prævia. He also describes the bimanual method of dilatation, which he says was introduced by Edgar. He credits Bonnaire with having revived it in Europe, and it is now known as the Edgar-Bonnaire method. It was practised in 29 cases in the Amsterdam clinic without any harm to the patients. The chief success of this method has been in cases of placenta prævia. He admits that Kouwer of Amsterdam and Mendes de Leon warn against this method as being liable to tear the cervix, especially in cases of placenta prævia.

Second method, by means of bags. He thinks Barnes's bags are chiefly of use in induction of premature labour when haste is not required. Elastic conical bags like Braun's are imperfect because of their elasticity. The full capacity cannot be known. If too much fluid is injected the bag may be ruptured, while if the bag is not filled premature expulsion is favoured. Even when the bag is full, by an amœboid movement it may be extruded into the vagina without completely dilating the cervical canal.

The inelastic bag, like that of Champetier de Ribes, he considers the best of all. Traction may be made on the bag to hasten dilatation, but there is danger here if the traction is too great. A weight of about 2 lbs. is harmless. He gives the names of a number of authors who favour bag dilatation, viz., Osterloh, Bardeleben, Keilmann, Dührssen, Ostreil and Blaker.

He quotes from an article by Bürger based on 117 cases. The cases were divided into five groups:—

1. "To save membranes in cases of contracted pelves"—5 cases, mothers all recovered, 4 children died (2 were perforated).

2. "As a substitute for the membranes"—8 cases, mothers all recovered, 1 child still-born.

3. "As a mechanical dilator"—10 cases of premature rupture of membranes with contracted pelves, all mothers recovered, 6 children died; 15 cases of transverse presentation, all mothers recovered, 4 children died.

4. "For scars from previous operations"—3 cases, in one of which cervical incisions were necessary, all mothers and children saved.

5. "Dangerous condition of mother, demanding delivery"—7 cases of high temperature, all mothers recovered, 3 children lost; 2 cases of detachment of placenta, mothers saved, children lost; 2 heart cases, both mothers and children lost; 1 case of nephritis, mother and child saved; 45 cases of eclampsia, 9 mothers died, and 21 children were lost; 19 cases of placenta prævia, 3 mothers died, and 5 children were lost.

Third method, by means of metallic dilators. The author describes and figures a number of the metallic dilators of the Bossi type, and quotes the opinions for and against the use of the instrument as contained in the writings of various authors. Sellheim, Martin, Dührssen and Bacon condemn Bossi's method, or consider it dangerous. De Lee had 3 cases, all fatal. Zangemeister warns against dilatation by the screw machines. Spastic re-contraction of the os upon the after-coming head is not an uncommon source of danger after Bossi dilatation.

The majority of the advocates of the Bossi method either consider placenta prævia as the most debatable indication or even an absolute contra-indication. The author concludes that the advocates of the branching metallic dilators, especially of the Bossi type, have not made out a case. He considers that all the instruments are dangerous as carriers of infection. For rapid dilatation he considers Harris's or Edgar's method the best, and when haste is not required Champetier de Ribes's or Voorhees's bags most useful.

The paper is the result of most extensive reading, judging from the bibliography (upwards of 80 references), but so far as one can judge the author has had no experience of the various methods he speaks about. When he has had some experience he will probably alter his views somewhat, and also come to the conclusion that these methods may be anything but bloodless. Williams, whom he quotes, found that it was necessary to stitch the cervix to control hæmorrhage in a considerable percentage of his cases.

ROBERT JARDINE.

Dilatation of the Cervix Uteri by Bossi's Dilator.

BLACKER. *Trans. Medical Soc., London*, 1906. Vol. xxix.—The author of this paper gives his own experience with the Bossi dilator, and reviews the results obtained by others in over 500 cases recorded in the literature on the subject. He considers that the dilator provides a means of dilating the cervix rapidly, and that it may be used before the cervical canal is obliterated as well as after dilatation has commenced. In cases where the

cervix is still unobliterated there is considerable risk of tearing the tissues, but this danger is not so great as some of the opponents of the method maintain, provided the instrument is used on the lines laid down by Bossi. The tears which have occurred in many instances have been due to the means adopted for the subsequent delivery of the child. The risk of lacerating the tissues exists even in cases where dilatation of the cervix has already commenced, and depends as much on the degree of softening of the tissues as on the amount of dilatation of the cervix which is present. As even in the most favourable conditions laceration of the cervix may occur, the dilator should only be used in the most urgent indications, that is to say, in cases where grave danger exists to the life of the mother or to that of the child, and where rapid emptying of the uterus is likely to lessen such danger. Happily such cases are of very rare occurrence, and while, therefore, Bossi's method of rapid artificial delivery may be of use in a few rare cases, yet if it be used indiscriminately and without great care it is likely to cause serious injuries to the cervix and even to the lower uterine segment. J. S. F.

The Induction of Premature Labour and Accouchement forcé in the first 5000 Labours in the Obstetrical Department of the Johns Hopkins Hospital.

Williams (J. Whitridge). *Surgery, Gynecology and Obstetrics*, September, 1906.—In this series of cases premature labour was induced by Krause's method 11 times; accouchement forcé by Harris's method of manual dilatation of the cervix was done 83 times, by the use of Champetier de Ribes's bag 15 times, and by vaginal Cæsarean section 2 times.

The induction of labour by bougies (Krause's method) was performed in 2 cardiac cases, in 2 cases of pre-eclamptic toxæmia, in 2 cases with retention of dead fœtus, in 2 cases for experimental purposes, in 1 case of hydramnios, in 1 case of intra-uterine infection during pregnancy, and in 1 case of over-development of the child.

All the patients recovered, and an examination at the time of dismissal revealed that the cervix was intact in 9 and slightly torn in 2 cases.

In the 83 cases in which Harris's method of manual dilatation of the cervix was used, 33 were cases of eclampsia, 7 were cases of pre-eclamptic toxæmia, 12 were cases of placenta prævia, and in 31 there was danger to mother or child during the course of labour. Of the eclamptic cases, 7 died, but as 5 did not regain consciousness after delivery the death was attributed to the disease, but two patients died as the direct result of the operation, 1 from infection and 1 from incomplete rupture of the uterus. The cervix was uninjured in 11 cases, slightly torn in 3, and deeply torn in 19. In 6 of the latter there was serious hæmorrhage, and immediate repair was called for. In 13 of the cases the cervical canal was intact and the external os not dilated. Goodell's or Hegar's dilators were first used to dilate sufficiently to allow of the introduction of the tips of two fingers. Of these 13 patients 4 died, 2 deaths being directly attributable to the operation—1 from infection and the other from incomplete rupture of the uterus. The cervix was uninjured in only 3 instances, slightly torn in 3, and deeply torn in 7. In 3 of the latter there was profuse hæmorrhage, and immediate repair was necessary.

In 7 cases the cervical canal was obliterated, but the external os was not dilated. One patient died in coma. The cervix was uninjured in only

2 instances, while it was deeply torn in 5 cases, 2 of which required stitching on account of profuse hæmorrhage.

In 11 cases the cervical canal was obliterated, and the external os dilated to less than 4 cm. One patient died in coma. The cervix was uninjured in 5, but deeply torn in 6 cases, 1 of which required stitching on account of profuse hæmorrhage.

In 2 cases the cervical canal was obliterated and the external os dilated to more than 4 cm. Both patients recovered.

In the 7 cases of pre-eclamptic toxæmia the cervical canal was intact, and the external os not dilated. Two of the patients died, 1 from toxæmia, and the other from incomplete rupture of the uterus. In 2 of the cases the cervix was not torn, in 2 it was slightly torn, and in 3 deeply torn, 1 of which was fatal and another required stitching for hæmorrhage.

In 12 cases of placenta prævia Harris's method was adopted. In 4 the cervical canal was intact, while in 8 it was obliterated and the external os more or less dilated. Three of the patients died, but 2 were ex-sanguinated when admitted, and in neither was there any injury to the cervix; the third died from hæmorrhage from an incomplete rupture of the uterus. The cervix was slightly torn in 1 case, and deeply torn in 6, in 5 of which stitching was necessary to check hæmorrhage.

In the 31 cases in which there was danger to the mother or child during labour, in 8 there was intra-partum infection, in 8 exhaustion, indicated by a pronounced rise in the maternal pulse, in 5 marked variations in the fœtal heart-rate, in 4 prolapsed cord, and in 6 various indications. One mother died from partial intestinal obstruction and extensive thrombosis of the vessels of the left leg originating during pregnancy. The operation was not the cause of death.

In these 31 cases the cervical canal was obliterated in all, while the os was dilated to less than 4 cm. in 9, and to a greater extent in 22 cases. The cervix was uninjured in 20, slightly torn in 6, and deeply torn in 5 cases, in 1 of which stitching was required.

In summarizing the results in these 83 cases in which manual dilatation was employed, it will be seen that there were 13 deaths, 4 clearly due to the operation (4·82 per cent.). Williams says that all these deaths occurred in his own hands and in the first 2,500 cases, so that several of them, at least, may be regarded as the premium paid for experience.

The cervix was not injured or only slightly torn in 50 out of the 83 cases, while it was deeply lacerated in 33 (39·79 per cent.). In 14 of the latter immediate repair was required to control the hæmorrhage.

Champetier de Ribes's bag was employed in 15 instances, 12 in cases of danger to mother or child, 1 in eclampsia, 1 in toxæmia, and 1 in placenta prævia. All the patients recovered. The cervix was uninjured in 6, slightly torn in 3, and deeply torn in 6 cases. In 2 of the latter, stitching was required to control hæmorrhage.

Vaginal Cæsarean section was employed twice in the 5,000 cases, once in eclampsia, and once in toxæmia associated with twin pregnancy. One of the patients died, partially from hæmorrhage following uterine atony and partially from the toxæmia.

In his summary Williams comes to the following conclusions:—

Krause's method. This is the safest method where immediate delivery is not urgently indicated. Its drawback is the length of time it takes.

Manual dilatation. He associates Harris's name with this as other American authors do. He concludes that it is difficult and dangerous in

all cases in which the cervix is intact and the external os not dilated, and in some cases of rigidity of the cervix it is impracticable. He considers that it should only be used in cases in which the cervix is soft when it is unobliterated. Where the cervix is obliterated and the external os offers the only resistance, he considers that manual dilatation is comparatively safe and may be readily accomplished. The more slowly the dilatation is accomplished the better it will be for the cervix. If 20 or 30 minutes are occupied in the dilatation serious laceration can be avoided, but it is so difficult to judge of time that a clock or watch should be used to time the operation. He has never used Bossi's dilator, and does not approve of its use. In cases of placenta prævia he considers the operation to be extremely dangerous, no matter what the condition of the cervix may be. In 50 per cent. of his cases there was considerable injury to the cervix.

Champetier de Ribes's balloon. Where haste is not essential he considers this method of dilatation satisfactory, provided the os will allow of the introduction of the bag. He believes that the use of the bag is the treatment *par excellence* in most cases of placenta prævia, but he confesses that this belief is not founded upon actual experience.

Vaginal Cæsarean section. He does not consider that this method is adapted for general employment in private practice. He has done the operation 4 times in his clinic with such success that he is inclined to adopt it in all cases in which prompt emptying of the uterus is called for where the cervical canal is intact. He thinks this operation may have a field of usefulness in the treatment of cases of placenta prævia, but he is not prepared to venture an opinion as to its merits. He strongly condemns ordinary Cæsarean section in the treatment of such cases.

It will be noticed that in this series of 5,000 cases labour was not once induced on account of moderate contraction of the pelvis. He believes that these cases should be allowed to go to full time, and if labour cannot be terminated by forceps, pubiotomy or Cæsarean section should be done.

ROBERT JARDINE.

The Technique of the Induction of Premature Labour.

PLAUCHU. *Lyon Médical*, 1907. Vol. cviii., No. 4, p. 144.—This paper contains a discussion of the relative advantages and disadvantages of the induction of labour by the bougie or by the dilating bag. The objections to the bougies are—the risk of accidental rupture of the membranes and of occasionally wounding the circular sinus of the placenta, but perhaps most of all the uncertainty of the result. Sometimes in primiparæ even the repeated introduction of bougies may not bring on labour for from five to twelve days. The opportune moment for induction may in this way be missed, and, further, the repeated manipulation greatly adds to the risk of infection. Of the dilating bags usually employed that of Champetier de Ribes is the one most commonly used. The large size usually employed has many objections; unless the bag of membranes is ruptured it unduly distends the lower uterine segment; it tends to displace the presenting part, and so on. These faults, however, are got rid of by using a much smaller bag, which acts not so much as a dilator of the cervix as simply to excite labour. Such a bag as used by the author of this paper is, when fully distended, about the size of a small orange, and contains about 180 c.cms. The small size of the bag prevents displacement of the presenting part, or tension in the lower uterine segment; the bag can be easily introduced without rupturing the membranes, and quickly provokes labour pains—in about two hours on an average. In the early stages it

acts as a dilator, and by the time it is expelled into the vagina the cervix is about the size of a five-franc piece and the bag of membranes can then continue the dilatation. The details of the technique, as recommended by Plauchu, are as follows:—The bag is disinfected by scrubbing with soap and warm water and is then washed over with alcohol and immersed for a quarter of an hour in a 1 in 1,000 sublimate solution. The cervix is seized with a volsella and drawn down towards the vulva and the index finger inserted into the canal and the lower 2 or 3 cm. of the membranes separated; the space thus made is gently douched out with an antiseptic solution. The bag, rolled up cigar-wise, is then introduced with the fingers and not with forceps. Forceps will only very rarely be required, as in the case of primiparæ with a very narrow cervical canal. The bag is then filled with 150 to 180 c.c. of boiled water. J. S. F.

Internal Diseases as Indications for the Interruption of Pregnancy.

Warfield and others. *Interstate Medical Journal*, 1906. Vol. xiii., No. 11, p. 863, etc.—These papers are the result of a discussion at the St. Louis Medical Society; they contain little more than expressions of opinion by their respective authors, but it may be worth while to note the general conclusions arrived at. The two most important communications are those by Warfield on tuberculosis, and by Vogt on heart disease, as indications for the interruption of pregnancy.

As regards tuberculosis, Warfield lays down the following principles:—(1) Tuberculosis of the larynx is a very grave complication of pregnancy, and is a justifiable indication for its interruption. To be of value it must be done in the first two months of the pregnancy. (2) In advanced cases of tuberculosis of the lungs in pregnant women abortion is not justifiable. The exhaustion following it differs very little from that of the normal puerperium. The child in such a case should be our first care. (3) In early tuberculosis of the lungs, if the process is advancing and the woman is losing weight, and if she can be put under the most favourable surroundings, there might be a justifiable indication for its interruption. (4) In early tuberculosis with the process apparently stationary, the patient should simply be kept under observation. There seems to be only one rule; if abortion is performed it must, in all cases, be done as early in the pregnancy as possible.

Vogt takes the usual line in regard to cardiac disease, and states that the indication for induction in such cases is disturbed compensation which does not improve under treatment. Such disturbances generally occur during the later months, but it may happen that the question may arise in the case of a woman who has had severe complications in a previous pregnancy, and who has, in spite of warning, again conceived; but it must be remembered that it does not necessarily follow that the same trouble will again take place, and therefore it is best in such circumstances to keep the patient under observation. Of course, with the knowledge of the previous history the development of symptoms would lead to an earlier interference.

Hyperemesis is considered by Moore, who concludes that there is but one form—the toxæmic hyperemesis—in which the interruption of pregnancy is indicated and that a careful chemical examination of the urine furnishes an early and certain means of recognizing the condition.

The paper on renal disease as an indication for the interruption of pregnancy contains nothing noteworthy. J. S. F.

Pubiotomy and its Relative Indications.

MONTGOMERY (E. B.). *Amer. Jour. of Obstet.*, Dec., 1906. Vol. liv., p. 771.—The author claims that pubiotomy offers many advantages over the older operation of symphysiotomy. He has collected together a mass of statistics, and states that in 133 recorded cases there was no maternal mortality in those not infected previous to operation; whereas Rubinrot, in his study of symphysiotomy published in Paris in 1899, collected all the cases published up to that time, and showed a 10 per cent. maternal mortality and a morbidity of 30 per cent. Other advantages claimed are (1) complete bony union can always be secured; (2) difficulty of locomotion and incontinence of urine have never been known to follow the operation; (3) sometimes a permanent increase of size in the pelvic diameters results. The operation is most commonly required in cases of contracted pelvis, but should not be undertaken if the true conjugate is less than 7 centimetres; it may also be called for in certain forms of mal-presentation, as, for example, an impacted persistent mento-posterior position of the face. The method of performing the operation is described as follows:—"The incision, which begins above in the middle line, extends downwards and outwards besides the labium majus to the lower end of the os pubis, where one feels the sub-pubic tubercle. One cuts directly upon the bone, as with this incision one encounters no large blood-vessels. It is not necessary to dissect from the bone. Through the upper angle of the wound one brings the ligature carrier behind the os pubis. With two fingers of the left hand in the vagina controlling its course, it is pushed in at the back of the bone and out at the lower angle of the wound, beside the sub-pubic tubercle. With this instrument one brings a large silk ligature behind the pubis and attaches it there. When one of the wire saws has been attached to one end it is drawn in behind the os pubis and the bone sawed through with it. The pelvis opens easily; the hæmorrhage is slight and easily controlled by compression. The clitoris,the urethra, the plexus of veins and the bladder remain entirely uninjured." This operation has been modified by Doederlein, who makes only a small incision above and below to facilitate the introduction and use of the saw, whilst Dührssen practises a subcutaneous method, employing one small incision only. With regard to the after-treatment, a simple girdle or strip of adhesive plaster serves to keep the ends of the divided bone in apposition. In Franks' clinic at Cologne the strapping is dispensed with, and the patient is made to lie in a trough-shaped mattress. A good bibliography of the literature of pubiotomy is given at the end of this article. HERBERT WILLIAMSON.

Clinical and Radiological Observations on 16 Pubiotomies with the Needle.

HOCHEISEN. *Archiv für Gynäkol.* Band lxxx., Heft 1, p. 99.—The author gives the result of 16 pubiotomies performed at Bumm's Hospital in Berlin. The operation is performed with Bumm's needle, which is inserted from below between the labia majora and minora, the latter, with the clitoris, being pushed to the side. The bone is incised with the needle-point and then a tiny saw is introduced while the needle is being withdrawn. The knees, which up to now were widely separated, are bandaged together and the legs further pressed together by two assistants. The saw, which is held as vertical as possible, is used until only the soft parts above can be felt and can be pressed into the gap between the bones. The saw is then withdrawn and the point of incision compressed with sterile swabs.

Then, if necessary, a catgut suture is applied—without separating the legs, if possible. The vagina is then plugged and pressure put on from above. A catheter is tied in, and an abdominal binder and a T-bandage are applied. After 24 hours the plugs are removed, and on the third day all dressings and the catheter are left off. The duration of the operation, from the insertion of the needle to the completed extraction of the child is 2—3 minutes. The patient lies flat with raised back, the knees and ankles being tied together; this position is retained for eight days. All the recorded cases were performed for generally contracted pelvis. Two bad tears were noticed, but the hæmorrhage soon yielded to ordinary suturing. Once the bladder was injured owing to slipping of the needle. A catheter was left in for a fortnight and a small fistula healed up after some time. In a few cases a vulval hæmatoma formed, but it was always absorbed without interference. In order to obtain a satisfactory widening of the pelvis the bone should be sawed through as near the symphysis as possible. A permanent increase of ½ to 1 cm. in the conjugata vera was noticed in all the cases. Some of the patients subsequently complained of not being able to separate the legs well, especially a dairymaid, who was unable to hold the pail while milking. Walking was never interfered with. One frequent bad result was prolapse of the anterior vaginal wall and of the uterus. Hocheisen is convinced that subcutaneous pubiotomy has a brilliant future, if applied to suitable cases of contracted pelvis. He appends Roentgen photographs of the 16 cases. H. T. Hicks.

The Healing of Pubiotomy Wounds.

Scheib. *Deuts. med. Wchnschr.*, 1906. No. 43, p. 1739; and No. 44, p. 1787—The writer bases his paper on 11 cases from Prof. v. Franqué's clinic at Prague, and on some 170 cases which have been recorded as operated on by Gigli's pubiotomy. He argues strongly in favour of this operation instead of symphysiotomy, on account of the more rapid recovery—the patients being able to return to work in three to four weeks. At this period there is firm fibrous union, which permits of slight movement at the sawn surfaces on extreme movements of the limbs, but too slight to interfere with walking. Bony union takes place some months later. Another advantage in pubiotomy over symphysiotomy is the rarity of laceration of the surrounding structures, such as the bladder or vagina. In regard to the latter, care must especially be taken in the case of primiparæ with narrow vaginæ not to allow too rapid descent of the head before the canal is sufficiently dilated. Colpeurysis or perinæal incisions will diminish the risk. Other causes of this accident are too rapid separation of the bones and a change in the ordinary birth mechanism. A full account is given of one case in the writer's series where a severe laceration of the vagina occurred communicating with the divided bone and with infection of the wound, though eventually the patient made a complete recovery. Of the 11 cases, all the mothers were discharged without any bad symptoms, and of the children only one died, and that not from the operation, but from the protraction of labour and delayed intervention.

J. S. F.

Modern Obstetric Operations.

von Bardeleben. *Berlin. klin. Wchnschr.*, 1907. No. 1, p. 20.—This paper contains an interesting review of several recent obstetric procedures based on the experience of Bumm's clinic in Berlin. The writer speaks

very strongly in favour of pubiotomy by the needle, as the results in 20 cases have been uniformly good. In cases of pelvic contraction between 7 and 8 cm. conjugata vera it ought to replace Cæsarean section. The great difficulty is the selection of the proper moment. The value of the so-called vaginal Cæsarean section of Dührssen is also urged, and there is a discussion on dilatation by the Bossi dilator and by bags. J. S. F.

Porro's Operation in an Achondroplastic Woman on whom Cæsarean Section was Performed for the Fourth Time.

Fruinsholz and Michel (Gaston). *Annales de Gynécol. et d'Obstét.*, January, 1907.—The case reported is of some interest owing to the repeated performance of Cæsarean section on the same patient, though at the fourth operation it was thought better to remove the uterus. The woman was suffering from achondroplasia, her pelvis being much contracted, the "diamètre utile" measuring only 59 millimètres. Her first two pregnancies ended in basiotripsy, the third, fourth and fifth were terminated by Cæsarean section, the children weighing 2,980, 1,700 and 1,800 grammes respectively. At the second Cæsarean section very marked utero-abdominal adhesions were met with which obliged the operator (Herrgott) to open the uterus on one side of the original incision. It was also noted that the uterine retraction was very poor. At the third Cæsarean operation the adhesions were much more difficult to deal with; these involved the omentum as well and caused so much torsion of the uterus that the right tube became anterior. Further, uterine inertia was so marked that severe post partum bleeding resulted and was only checked by compression of the aorta. The patient's sixth pregnancy ended in abortion at the fifth month. Her seventh and last pregnancy went to term, and she was admitted in labour to the Maternity of Nancy for her fourth Cæsarean operation August 21st, 1906. On cutting through the abdominal walls all trace of the original layers was lost in dense cicatricial tissue. The anterior uterine wall was also involved and was very adherent to the scar. The uterine cavity was accidentally opened almost with the first stroke of the knife, and the opening was subsequently enlarged upwards by scissors. On extraction the child was found to weigh 2,938 grammes, and soon breathed well. After removal of the placenta and membranes the uterine cavity was packed with gauze. The uterus was then freed from the anterior abdominal wall, but so dense were the adhesions that a considerable area of skin had to be removed at the same time. The body of the uterus was then removed by Porro's method, the stump being brought outside and fixed in the abdominal incision. The patient did well, and left the hospital on the 26th day. The authors give an interesting account of the portion of uterus removed which showed abundant macroscopic evidence of the previous operations. So thin was the scar in the anterior wall that in places it was only 2 centimetres thick. The skin actually formed a part of the scar. Thus, as the authors remark, another pregnancy might well have ended in rupture of the uterus. Microscopically, in the region of the scar the connective-tissue was found to be traversed by bands of smooth muscular fibres; amid these were areas of migratory cellules grouped around empty spaces. These spaces were thought by the authors to be the sites of the original sutures used in the former Cæsarean sections.

C. Hubert Roberts.

Cæsarean Section complicated by Round Worms.

Landon (Ethel). *Brit. Med. Journ.*, Jan. 26th, 1907.—An osteomalacic dwarf, a iii.-para, was admitted in labour. She had had diarrhœa

for ten days. Cæsarean section was performed. For four days the temperature remained above 101°F. There was no abdominal tenderness or distension, and the vaginal discharge was free and inoffensive. Malaria being suspected, quinine was given. This had no effect on the temperature. There was diarrhœa, with the discharge of pus from the rectum. On the fifth day a long irrigation of the bowel with sublimate 1 in 10,000 was given. On its return a large round worm was passed. Santonin was given, and more round worms were discharged. Thereafter the pyrexia decreased, and the temperature soon became normal. The pyrexia, diarrhœa and discharge of pus were thus directly due to irritation from the presence of round worms in the intestine, and not to any infective focus at the seat of operation. FRANK E. TAYLOR.

Cæsarean Section in a Case of Contracted Pelvis with Twin Pregnancy.

COWEN (G. H.). *Brit. Med. Journ.*, Jan. 26th, 1907.—The operation was performed during labour in a primipara, aged 35, 4 ft. 9 in. in height, who presented marked rickety deformity of the thighs and legs, and who complained, a few days before the onset of labour, of headache and vomiting. The urine contained albumen and casts. The conjugata vera was about 3⅓ in., but the fœtal head lay in the right iliac fossa, and could not be made to enter the brim by pressure from above. This fact, rather than the measurement of the conjugate, was the indication for Cæsarean section. The presence of twins was only determined after the uterus had been opened. The patient recovered; albumen and casts persisted for about four weeks, and then disappeared. FRANK E. TAYLOR.

A Case of difficult Labour after Ventral Fixation.

HOCHEISEN. *Zeits. für Geburts. und Gynäkol.*, 1906 Band lviii., Heft 2, p. 334.—The patient, aged 31, had had one child 12 years before coming under Hocheisen's care. The labour was normal, but she had some puerperal illness, and a few months after her confinement ventral fixation was performed on her in Frankfort, three stitches being passed through the fundus of the uterus, while the wound was packed to ensure the formation of firm adhesions. Her last menstruation was in August, 1905, and quickening occurred in January, 1906. Pains began on April 18th and increased in severity until on April 24th she thought that she was in labour. On the 26th about a litre of liquor amnii came away. On the 28th she was admitted into the Charité in Berlin. The fœtal heart could not be heard. On examination per vaginam under an anæsthetic nothing could be felt on insertion of two fingers. When the whole hand and forearm were introduced the posterior lip of the cervix was felt above the 2nd lumbar vertebra, and two fingers could be passed into the cervical canal, but it was impossible to pass them on through the internal os into the cavity of the uterus, the angle being too acute. The anterior lip of the cervix projected as a spur, and the whole of the true pelvis was filled up by the anterior uterine wall. The child was found to be lying with its back directed to the front, its breech to the right and head to the left. Attempts at delivery failed, as it was impossible to reach a foot. Prof. Bumm was unwilling to perform Cæsarean section, since, the liquor amnii having escaped two days before, the child was possibly dead and macerated, and the danger of sepsis was very great. Vaginal Cæsarean section by the ordinary method was impossible as the longest speculum failed to expose the anterior lip of the cervix. He therefore inserted a long sickle-

shaped knife and cut through the spur, after which turning and extraction were performed with ease. The bladder was not wounded. The patient made a good recovery. On examination some weeks later the fundus was found to be fixed. As the greater part of the internal surface was exposed through non-union of the incised anterior wall a recurrence of pregnancy was impossible. The child was born alive after all.

HENRY RUSSELL ANDREWS.

Case of Obstructed Labour due to Osteo-sarcoma of the Pelvis.

RAY (M. B.). *Brit. Med Journ.*, Jan. 26th, 1907.—A ii.para, aged 20, was admitted into hospital in labour with a mass blocking up the vagina. The mass felt cystic. It was incised from below, and a mass of soft friable growth mixed with blood clot was removed. Bleeding was difficult to check. The child was turned and delivered, and was born dead. The mother also died just as the head was being born. The growth was confined to the sacrum and coccyx, and was found to be a mixed-celled sarcoma, spindle and myeloid, probably of periosteal origin.

FRANK E. TAYLOR.

Rotation of Mento-posterior Cases by Bilateral Divergent Traction applied by a Fillet on the Blades of the Forceps.

GONNET. *Lyon Médical*, 1907. Vol. cviii., No. 5, p. 193.—The title explains the object of this paper fairly well. It is to record the successful application of the method introduced by Chassagny, Laroyene, Fochier and others and recently described by Commandeur and Michel in regard to occipito-posterior positions, to three mento-posterior cases. A knowledge of the use of a fillet on the blades as a means of traction is assumed by the writer of the paper, and hence the exact details of its application are not given. The object and the mechanics of the method are quite clear. Instead of attempting rotation of the head by rotating the handles of the forceps, which is stigmatised by the author as "a blind, brutal and dangerous" manœuvre, an attempt is made to turn the head round the axis of the blades by the force being applied directly to the blades themselves through flexible bands, and thus acting on the principle of the "couple." For instance, in the first case described, a R.M.P., the forceps was applied and locked. After a little direct traction, bilateral divergent traction was begun on the fillets. The right band taken in the right hand and pulled to the left above the joint of the forceps, the left band being pulled by the left hand to the right below the forceps. By traction in this way the handles of the forceps gradually turned, so that in the course of twenty minutes the concavity of the blades was looking backwards and the face was in a R.M.A. position. The forceps was then removed and reapplied in the new position and delivery easily effected. The other two cases are simply a repetition of the first; all the three children survived. Traction on the fillets is made intermittently, and the force does not exceed 10 to 12 kilos.; it is made simultaneously by the two bands in a crossed direction, so that when rotation has taken place the left band has passed completely over to the right and the right to the left. The mechanical advantage of traction on an elastic band attached to the two extremities of a diameter passing through the centre of the body which is to be turned is evident. The author recommends this method as simple and easy. In order to distinguish the bands, one knot may be placed at the end of the left one and two on the right. This paper is well worth study.

J. S. F.

Removal of the Head when retained in the Uterus after Separation of the Trunk.

Borgnis. *Deuts. med. Wchnschr.*, 1906. No. 42, p. 1707.—The writer advises, in cases where the cervix has closed down after the trunk has been torn away from the after-coming head, that a hold on the head should be obtained by the use of a strong volsella or a tumour forceps or some similar instrument, so that by means of a weighted cord fastened to the forceps and hung over the end of the bed, dilatation may be brought about and the head after a time be delivered by traction on the forceps. He also endeavours to reply to the criticisms of this manœuvre—mainly those on the ground of infection from the prolonged manipulation—which were brought forward when the method was first described (*Zentralbl. für Gynäkol.*, 1905, No. 35, p. 1151), and quotes a case in which the head was used in this way as "metreurynter" for 24 hours, with a successful result. J. S. F.

OVARIES AND FALLOPIAN TUBES.

Contribution to the Anatomy of the Ovaries of the Newborn and of Children before Puberty.

Runge (Ernst). *Archiv für Gynäkol.* Band lxxx., Heft 1, p. 43.—Runge gives the results of his investigation of 50 pairs of ovaries which were obtained from 10 fœtuses between 4 and 9 months, 22 full-time infants, and 18 children ranging between 3 months and 9 years of age. He found that before the normal end of pregnancy the ovaries showed growing follicles in rare instances only. They appeared as a rule in the full-term new-born. During the first year of life growing follicles of considerable size were always present, and in one instance a typical corpus albicantium was seen. During the second year growing follicles and ova with a diameter of 135 μ were present, and the ovaries contained typical follicular cysts and corpora albicantia. During the third year the ovaries contained advanced and also degenerating follicles, or follicles turned into corpora albicantia. The primordial follicles decreased in number, and the stroma ovarii assumed the aspect of the adult ovary. During the following years progress was further maintained until the ovaries were scarcely distinguishable from those of adults except by their size. It is thus shown that the development and maturation of the follicles take place in infancy and does not set in—as has always been assumed—with puberty. Runge once found a corpus luteum in a new-born infant which shows that fœtal follicles may mature and rupture, but this he believes to be rare. The tunica albuginea is not clearly recognizable before the second year, and is not fully developed till the fifth year. The fœtal primordial follicles were always grouped together in tubes or balls, but in after years all attempts at any method of conformation was lost. Runge agrees with Gebhard that the cysts are due to degeneration of follicles, except where excrescences, proliferation of epithelium, etc., are present and indicate a true neoplasm. In some follicles Runge observed a transformation from theca interna cells into lutein cells, showing that lutein cells are nothing but sodden, enlarged and altered theca interna cells. He also found some curiously large ova with two or three nuclei which showed no attempt at segmentation. The author

believes these to be single twin or triplet ova, and not ova in the process of segmentation; of these latter he found a great number. The author appends a table of his 50 cases. H. T. HICKS.

The Final Results of Ovariotomy.

GLOCKNER. *Archiv für Gynäkol.* Band lxxx., Heft 1, p. 1.—Glockner records the results of 500 ovariotomies performed at Zweifel's hospital at Leipzig. The term recovery is applied to cases which have not recurred and are well five years after operation:—

1. Ovariotomy for fibromata, 88 per cent. recoveries.
2. „ „ sarcoma (primary of ovary), 40 per cent. recoveries. Removal of second ovary not indicated.
3. „ „ cystoma serosum simplex, 96·6 per cent. recoveries.
4. „ „ cystoma glandulare, 94·4 per cent recoveries. Removal of the second ovary contra-indicated in young subjects, advisable in patients near the menopause. Secondary carcinomatous growths found in 3 cases out of those where the second ovary was not removed.
5. „ „ cystoma pseudo-papillare, 100 per cent. recoveries.
6. „ „ cystoma papillare, 89 per cent. recoveries. The recurrences were of a carcinomatous character. Removal of the second ovary indicated.
7. „ „ primary carcinoma ovarii, 36·1 per cent. recoveries. Removal of the second ovary and also of the uterus indicated. Fifty-four per cent. recurred during the first year, 22·7 per cent. during the second, 9·1 per cent. during the third, 9·1 during the fourth, and 4·5 during the seventh.
8. „ „ dermoid cystoma, 95·8 recoveries. Removal of the ovary not advisable in young subjects.
9. „ „ teratoma, 50 per cent. recoveries (only 2 cases recorded).
10. „ „ cysts of the parovarium, 97·4 per cent. of recoveries.

H. T. HICKS.

Primary Carcinoma of the Fallopian Tube.

KUNDRAT. *Archiv für Gynäkol.* Band lxxx., Heft 2.—Kundrat describes two cases of primary carcinoma of the Fallopian tube. Metastases were found in the ovaries, pelvic glands, uterus, adnexa of the other side, etc. The epithelium found in carcinoma of the tube is ciliated, short cylindrical, cuboid, often spindle-shaped, round or irregular, even square. The nuclei are dark and irregular, often entirely filling the cell. Villi with hyaline degeneration were seen in the author's cases. The connective tissue was composed of round cells, poor in nuclei, and where it entered the new growth presented a highly-degenerated hyaline structure.

H. T. H.

Decidual Formation in the Ovaries during Intra-uterine Gravidity.

HÖRMANN. *Archiv für Gynäkol.* Band lxxx., Heft 2.—The author describes changes which he found during intra-uterine pregnancy in the ovaries, closely corresponding with the decidual changes in the uterus. He describes decidual clumps, a fine intra-cellular network, syncytial cells, and an almost constant presence of centresomes in the large decidual cells.

H. T. H.

Intraperitoneal Hæmorrhage arising from the Uterine Adnexa.

NOETZEL. *Beiträge zur klinischen Chirurgie.* Band li., Heft 3, p. 714.—Noetzel records nine cases of torsion of an ovarian pedicle, and also some cases in which a diagnosis of appendicitis was made, but which subsequently proved to be cases either of torsion of an ovarian pedicle or of tubal pregnancy. In discussing the treatment of these cases, Noetzel draws attention to the fact that the danger is not so much from hæmorrhage as from septic infection. He recommends the introduction of a drainage tube into the peritoneal cavity for 24 hours in all cases.

E. SCOTT CARMICHAEL.

REPORTS OF SOCIETIES.

OBSTETRICAL SOCIETY OF LONDON.

Meeting held February 6th, 1907, Dr. W. R. Dakin, *President, in the Chair.*

The following specimens were shown:—

Mr. J. Bland-Sutton: A *Villous Tumour of the Body of the Uterus* in a woman æt. 84 years. Hysterectomy. Recovery. Reported in this number of the Journal, p. 246.

Mrs. Boyd: A specimen of *Diffuse Fibro-myoma of the Uterus* occupying the whole of the supra-vaginal portion of the cervix and the greater part of the body, partially intra-ligamentous and sub-peritoneal in its development, and complicated by pregnancy in the right cornu of 3–4 months' duration. A specimen of *Papilliferous Cystic Adeno-carcinoma of the Left Ovary* removed from a patient of 54.

Mr. Doran (for the late Dr. G. Bagot Ferguson): *Chorio-epithelioma of Uterus.* Intra-peritoneal hæmorrhage; hysterectomy; death.

Dr. Tate: Case of *Suppuration in Fibro-myoma Uteri* following delivery and treated by abdominal hysterectomy. Case of *Co-existing Tubal and Uterine Pregnancy.* Tubal pregnancy treated by abdominal section; subsequent delivery of living child at term.

After the reports of the Treasurer and the Hon. Librarian had been read and adopted, the President delivered his Valedictory Address.

The names of the officers and Council for the ensuing year were announced, and the proceedings closed with votes of thanks to the retiring President, officers and members of Council.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held at Manchester, January 18th, 1907, Mr. R. Favell (Sheffield) *in the Chair.*

Dr. E. O. Croft (Leeds) was elected President; Dr. J. H. Willett (Liverpool), Secretary; and Dr. W. K. Walls (Manchester), Treasurer for 1907.

Mr. Favell showed a large *Hypernephroma of the Left Kidney* which occupied the pelvis and lower portion of the abdomen, and was successfully removed by the abdominal route.

Dr. J. B. Hellier (Leeds) showed a *Fibroid Polypus of the Cervical Canal* which was of such a size that it completely filled the vagina, and was so irregular in form that it closely simulated a "cauliflower excrescence of the cervix."

Dr. A. J. Wallace (Liverpool) showed a *Uterus removed for Cancer of the Cervix by the Abdominal Route*, with extensive dissection of the pelvic glands and connective-tissue. The obturator gland was shown to be much

enlarged by secondary deposits, as were also glands dissected off the iliac vessels. Dr. Wallace regarded vaginal hysterectomy as merely palliative. He had done the extensive abdominal operation in nearly 20 cases, with a mortality of under 30 per cent. In fat subjects the operation was dangerous and prolonged, but in thin patients it did not appear to be attended by undue risk.

Dr. LLOYD ROBERTS (Manchester) showed a *Fibroid* 13 inches in diameter and weighing over 32 lbs. It was removed from a multiparous widow, aged 44 years, who had been aware of its presence for 14 years. It finally produced pressure symptoms, menorrhagia, and metrorrhagia. The capsule was incised, and the growth enucleated as a preliminary to the removal of the uterus at the level of the internal os. Recovery was uneventful.

Dr. E. S. BISHOP (Manchester) showed a specimen illustrating the advantage of *Anterior Vaginal Hysterotomy* for the removal of certain sub-mucous fibroids, also an example of ectopic gestation, in which the symptoms and history suggested gonorrhœal pyosalpinx rather than tubal pregnancy.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting held December 19th, 1906, DR. OLIPHANT, *President, in the Chair.*

Dr. MUNRO KERR showed:—

(*a*) A specimen of *Multiple Fibroids of the Uterus.*

(*b*) *Myoma of Uterus.*

Dr. JAMES DUNLOP: *Fœtus at Sixth Month showing acute general œdema with desquamation and fine capillary hæmorrhages.* The placenta was œdematous, but did not show evidence of disease on microscopical examination.

Dr. TEACHER gave a report on Dr. Wilson's specimen shown at last meeting.

Dr. MCILROY showed for Dr. J. K. Kelly a specimen of *Adeno-Carcinoma of the Ovary.*

Dr. BALFOUR MARSHALL read notes on the following cases:—

CASE I. "Patent Urachus over one inch in diameter forming a Tubular Prolongation of the Bladder."

The patient, aged 43, had suffered from uterine prolapse, and was admitted to hospital for an operation. On opening into the abdomen for the performance of fixation of the uterus a small quantity of clear fluid was seen escaping through an opening from the bladder on compression of that organ. It was found that the wall of a patent urachus lay under the subperitoneal fat in the abdominal incision and had thus been opened into. This was dissected out as far as its connection with the bladder, the edges were inverted and closed by a catgut suture, after which the uterus was fixed to the abdominal wall. (For full report, see p. 259.)

CASE II. "Rhythmic or Hysterical Chorea in Early Pregnancy."

The patient, aged 21, two months pregnant, showed signs of spasmodic contractions of the lower limbs, of the arms and afterwards of the thorax and neck; the cause being some family worry. These movements continued for several days and were absent during sleep, gradually disappearing on the fifth day. The treatment was rest, isolation, with potassium bromide, asafœtida, and valerian. (For full report, see next month's JOURNAL.)

CASE III. "Continued Metrorrhagia during Pregnancy ending in Abortion at Sixth Month. Mistaken Diagnosis of Hydatidiform Mole."

The patient, aged 26, had a twin pregnancy twenty months previously. Menstruation was regular for a year, then the periods occurred more frequently and were prolonged and irregular. The patient had no suspicion of pregnancy being present.

On examination an oval tumour was found rising to near the umbilicus with definite contractions. The diagnosis of molar pregnancy was made on the symptoms of atypical hæmorrhage and on the size, shape and consistence of the uterus; no fœtal parts were made out. Ergot was given, but as the hæmorrhage continued and became more profuse the question of interference was considered. Four weeks later the patient gave birth to a still-born fœtus which appeared to be in a fresh condition. The placenta and membranes appeared normal. The probable source of the hæmorrhage was an endometritis decidualis.

The papers were discussed by Dr. SAMUEL SLOAN, Dr. CASKIE and Dr. JARDINE.

The PRESIDENT read notes from an ethnological paper by Mrs. Daisy Bates (Australia) on MARRIAGE CUSTOMS, ETC., IN WESTERN AUSTRALIA.

Meeting held January 23rd, 1907, DR. OLIPHANT, *President, in the Chair.*

Dr. SCOTT MACGREGOR showed a *Dermoid Cyst of the Left Ovary* and a *Small Cyst of the Right Ovary* removed from a patient aged 25.

Dr. JARDINE showed:—

(*a*) *A Fœtus with Malformation*, the neck being absent, and the head telescoped on the vertebral column. This specimen was referred to Dr. Lindsay for further examination.

(*b*) *Uterus with Pregnancy* removed post mortem from a patient who had died from pernicious vomiting. Blood and pus had been found in the urine. The bladder showed hæmorrhagic patches on its mucous membrane; the liver was enlarged and mottled. There was no displacement of the uterus.

Dr. OLIPHANT gave his INAUGURAL ADDRESS as President. After a few preliminary remarks on medicine during the time of the Reformation, he gave a sketch of medical science in Scotland about the time of the Union in 1707. He showed that the state of religious and social unrest at the end of the seventeenth century throughout Europe was not conducive to scientific progress; freedom of thought was impossible, and medicine was to a large extent controlled by the teaching of the ancients. It was a dark age before the emancipation of the eighteenth century.

Dr. Oliphant illustrated the medical thought of the time by quotations from Pitcairn, Cheyne, Etmüller and others, and by references to popular medicine, as in the prescription of Moncrief of Tippermalloch. He maintained throughout his paper that the state of medical knowledge in Scotland was not lower than in the rest of Europe.

EDINBURGH OBSTETRICAL SOCIETY.

Meeting held Wednesday, January 9th, 1907, J. W. BALLANTYNE, M.D., F.R.C.P.E., *President, in the Chair.*

Dr. PORTER communicated a CASE OF ALBUMINURIA caused by the pressure on both ureters of a multilocular cyst attached to the broad ligament. The onset of the albuminuria was sudden, and was accom-

panied by general œdema and other signs of renal disease. The tumour was removed by operation, and the albuminuria disappeared some weeks later under suitable dietetic treatment.

The case was discussed by Dr. HAULTAIN, Prof. KYNOCH, Dr. THOMAS KERR and Dr. RITCHIE.

A paper entitled INTRACTABLE UTERINE HÆMORRHAGE AND ARTERIOSCLEROSIS OF THE UTERINE VESSELS was read by Dr. ELIZ. H. B. MACDONALD, which was published in the last number of the JOURNAL.

SPECIMENS.

Dr. HAULTAIN showed: (1) *Twisted Parovarian Cyst*, with an intraligamentary hæmorrhage, the ovary not being involved at all. (2) *Diffuse Uterine Fibrosis*, with hypertrophy of the mucous membrane. The uterus had been removed for hæmorrhage. (3) *Sarcoma Uteri*. The growth was of the small-celled variety, and had perforated the uterine wall causing secondary involvement of the peritoneum and surrounding organs. The patient was now (seven months after operation) in perfect health. (4) *Uterus removed for Perforating Abscess in the Wall* in a case of septicæmia following abortion. The patient appeared to be in a hopeless condition, but ultimately recovered. (5) *Three Cases of Fibroid Uteri with Adenomatous Polypi*. (6) *Uterus with Multiple Fibroids* which had become impacted and caused retention of urine, and which showed a very curious relationship of Fallopian tube to round ligament.

REVIEWS OF RECENT BOOKS.

OPERATIVE GYNÆCOLOGY. By Howard A. Kelly, A.B., M.D., LL.D., Hon. F.R.C.S., Ed. With 11 plates and 703 original illustrations, for the most part by Max Brödel. Second Edition, revised and enlarged. London: Sidney Appleton, 1906.

(First Notice.)

As Professor Kelly reminds us, it is nine years since the publication of his great work, "Operative Gynæcology." A new edition is now before us, not an enlarged and unwieldy Gynæcology, but a new edition in which the insertion of new material has gone hand in hand with a careful excision and compression. Unnecessary or imperfect illustrations have been removed; the whole text has been revised and re-arranged; many new chapters have been introduced, and yet the present two volumes are slightly smaller than those of the former edition, while the value of the book is considerably enhanced.

The more frequent use of leaded type for the headings of sections and sub-sections makes these stand out more clearly in the present volumes, and a large number of new illustrations fully maintains, both in choice and in execution, the high reputation of the author and the artist.

The general trend of the alterations and additions may be said to bring the book more into line with other works on the whole of gynæcology, for most of the new chapters in the first volume deal with non-operative work. Whether the author has been altogether well-advised in making this important alteration and extension of his work may be a matter of opinion. The lines on which the first edition was framed, though somewhat arbitrarily chosen, were essentially those of higher operative work. Under these circumstances it was only natural to find a rather cavalier treatment accorded to the inferior classes of palliative treatment and minor surgery. Now that these subjects receive a more extended consideration, the contrast appears to be rather intensified than lessened. The masterly and thorough exposition of the operative details belonging to major gynæcology makes one expect and seek for the same breadth of mind, ripeness of experience and fulness of treatment in minor matters. It must be confessed that the expectation and seeking are not always satisfied.

It is, however, hardly generous to say so much of criticism when the great work of Kelly's life in abdominal surgery and in the treatment of the female bladder and ureters is here brought fully up to date and demands the fullest praise and even reverence.

VOL. I.

The first volume, which was formerly divided into 19 chapters, now contains 25. It may be of interest and value to take these *seriatim* and indicate as briefly as possible some of the main alterations and omissions.

Chap. I. "*Sepsis, Asepsis and Antisepsis in Hospitals.*"

Operating gloves and mouth protectors are recommended. The use of potassium permanganate and oxalic acid still holds the chief place (and we think deservedly) for sterilization of the hands. The illustrations of the hand-basins (Figs. 4 and 5) and the Boldt operating table (Fig. 6) are new, but there is no figure or even mention of any operating table with a central pivot (allowing for the rapid reversal of position). This is remarkable.

Chap. II. "*Antisepsis and Asepsis in Private Practice.*"

A fuller operative-kit.

Chap. III. "*Bacteriology*" (re-written by Dr. Ford).

A special paragraph on cystitis. Less is made of Döderlein's bacillus as a cause of vaginal sterility.

Chap. IV. "*Topographical Anatomy.*"

This is considerably improved. There are fresh illustrations of the positions and relations of the appendix; also one of the "cœliotomy veins."

Chap. V. *On* "*Gynæcological Examination.*"

In this chapter there is a good (new) anatomical illustration of the knee-chest position. Fresh methods of examination are described and figured—(*a*) by the "piezometer," and (*b*) by the cylindrical speculum in virgins. Another good illustration is that showing the method of examination through the distended rectum (Fig. 66). Many of the old illustrations are left out (75 to 78).

Chap. VI. *On* "*Instruments and Dressings.*"

This is chiefly noticeable for the omission of some of the old illustrations on "knot-tying."

Chap. VII., VIII., and IX. are entirely new.

Chap. VII. is on "*Local and Palliative Treatment.*"

Chap. VIII. is on "*Menstruation and its Anomalies.*"

Chap IX. is on "*Uterine Displacements and their Treatment by Pessaries.*"

Chap. X. *On* "*Anæsthesia,*" is by Dr. Cook.

The directions are simple. Spinal anæsthesia is dismissed as unsafe and unsatisfactory. The chief new matter is a section on blood pressure during anæsthesia, and the figure of an apparatus for its determination.

Chap. XI. *On* "*Congenital Affections*" (corresponding to part of former Chap. XI.).

Two additional illustrations are given of uterine and vaginal doubling.

Chap. XII. *On* "*General Principles involved in Plastic Operations.*"

This contains the figure of a perineal drainage-cushion for operative work. Important additions are made under the headings of "Operation" and "Tissues."

Chap. XIII. *On* "*Diseases of the External Genitals.*"

This chapter has a very good (new) anatomical drawing of Bartholin's

gland and duct (Fig. 132), accompanied by a fuller description and section-illustration of the gland. The recto-vulval fistula and abscess (simulating vulvo-vaginal abscess) are not mentioned.

Chap. XIV. On "Diseases of the Hymen."

Chap. XV. On "Rupture of the Recto-Vaginal Septum and Relaxed Vaginal Outlet."

In this the use of the little vaginal flap (with illustration) is new, also the repair of the sphincter without a perineal operation. At the end of the chapter new figures and illustrations are introduced showing what is said to be the reunion of the levator ani muscles. These illustrations would do better (we think) to show the reunion of the pelvic fascia. The want of a full recognition of the importance of the stretching and tearing of the fascia as also that of its definite repair is rather remarkable.

Chap. XVI. On "Diseases of the Vagina" (instead of "Operations on the vagina").

Considerable new matter and several new illustrations will be found regarding vaginal cysts and the embryonic structures from which they may be derived. Figs. 188 and 189 are especially useful.

Chap. XVII. On "Affections of the Urethra and Bladder."

This has been re-written. The urethral "labiæ" (*sic*) are described and figured. There is a good illustration of a gonorrhœal peri-urethral abscess. The author still appears to advise incision rather than excision of the sac of a sub-urethral abscess. This seems strange. On the other hand, he now advises incision of the bladder in chronic cystitis rather than ballooning. This accords more with English practice. The use of the "mushroom catheter" may be a detail worthy of remembrance. Two new illustrations are those showing the detection of a calculus by the cystoscope and its subsequent removal (Figs. 244 and 245).

There appears to be a rather important misprint on p. 68. For "ureteral" read "urethral."

Chap. XVIII. On "Affections of the Ureters."

This continues the consideration of the subject which Prof. Kelly has more especially made his own, and shows evidences of improvement. Nos. 294, 295 and 296 are new illustrations. The use of the wax-tipped bougie, as suggested in the first edition, has become a proved method of diagnosis.

Chap. XIX. On "The Use of the X-Rays in Detecting Calculi" (by Dr. F. H. Baetjer).

This is an entirely new chapter, short and useful.

Chap. XX. On "Minor Gynæcological Operations."

This chapter is but little altered. With the exception of a paragraph dealing with anterior hysterotomy as an important aid to digital exploration of the uterine cavity (a procedure recognized for many years in our own country and on the Continent of Europe), the chapter still seems rigidly to exclude many of the more common operations and operative methods. Special features are the serrated curettes and a new section-illustration of squamous-celled carcinoma of the cervix.

Chap. XXI. On "Vaginal Hysterectomy" (formerly Chap. XVI.).

Chap. XXII. On "Prolapse of the Uterus."

Here there is a better arrangement of figures and cases. Dr. Kelly still advises amputation of the cervix.

Chap. XXIII. On "Inversion of the Uterus" (by Dr. Dobbin).

This chapter is perhaps the weakest in the book. The classification into "Post Partum" and "Pathological" is curious, and the two best methods of treatment in chronic inversion are altogether ignored. These are (1) the use of the repositor of Aveling or Tait, and (2) the treatment by anterior vaginal hysterotomy.

Chap. XXIV. On "Vaginal Extirpation of Submucous Myomata and Polypi."

This chapter still speaks of the ligature of the pedicle in both conditions, and of the use of the écraseur. These seem rather out of date.

Chap. XXV. On "The Uterus as a Retention Cyst."

This contains a good new illustration, Fig. 373.

The second volume will be reviewed in our next notice.

J. W. T.

NOTE-BOOKS AND DIARIES FOR DOCTORS AND NURSES, 1907. London: Scott and Bowne Ltd., The Chandos Press.

The doctor's diary is distributed so generally and is so well appreciated by the profession that we need not call further attention to it. That for nurses will not be so well known; it is very similar in character to the other, and contains information on many matters of interest to nurses and midwives; for the latter we note there is an account of the Midwives Act, notes on infant feeding, sick room cooking, and so on—all very instructive. The list of medical prescription abbreviations we think especially useful. The glossary of medical terms is in need of revision, however; "neurotic" is explained as "medicines which relieve the disorders of the nerves;" this is not the meaning most commonly applied to the term now-a-days.

A SERIES OF MIDWIFERY WALL DIAGRAMS FOR THE INSTRUCTION OF MIDWIVES AND STUDENTS OF MIDWIFERY. By Victor Bonney, M.S., M.D., etc., Lecturer on Practical Midwifery, Middlesex Hospital.

The want of a good set of diagrams has been widely felt amongst those who are responsible for the teaching of pupil midwives, and we are therefore glad to be able to draw attention to the series prepared by Dr. Bonney. For the most part these diagrams consist simply of enlarged drawings of the type usually found in the text-books in common use. Perhaps the best are the large number which illustrate the positions and mechanisms, though the constant presence of the placenta in the fundus uteri, expanded like a parasol over the fœtus, becomes irritating, and may serve to convey to students the impression that the placental site is immutable. No. 22, illustrating the puerperium and containing charts and diagrams of involution is a useful sheet.

But it is not difficult to find points for criticism. To begin with, the series is too crowded—instead of 160 diagrams, half the number would have been ample—each sheet is too crowded, and in some cases individual diagrams are also too crowded to be easily followed by those not educated

in the appreciation of diagrammatic representation. Some are incorrect, as, for example, Fig. 80, where, in illustrating face and shoulder traction in breech cases the child ought to be shown astride the attendant's arm instead of alongside it, but perhaps the one which is most open to objection is No. 84, showing a patient without pillows lying in a bed with the end raised. First of all, this is not a subject which requires a diagram, but if it is thought worthy of illustration the author ought not to have described it as "position of the patient in severe hæmorrhage," for that is helping to perpetuate one of the commonest errors met with in midwife students, who are ever anxious to describe this position as a means of checking hæmorrhage instead of a means of combating its effects.

We feel certain, however, that there is a wide sphere of usefulness for these diagrams.

DIE NEUE KÖNIGLICHE FRAUENKLINIK IN DRESDEN. By Prof. Dr. Leopold and Geh. Baurat Reichelt. Leipzig: S. Hirzel.

This book gives a detailed account of the buildings and of the work and teaching of the new Frauenklinik in Dresden. It contains sixty-seven pages of text, thirty-five full-page photographic reproductions and twelve plans.

The first twenty pages and the plans are the work of the architect, and together provide a very complete account of the various parts of the hospital with statistics as to measurements and cost. Much valuable and practical information is contained in them, and they are worth careful study by those interested in the building and fitting out of similar institutions elsewhere. At the same time, a very superficial glance at the plans will serve to indicate many points of divergence from what is customary in this country. To begin with, the hospital, as is the rule on the Continent, is one for both lying-in women and for gynæcological patients. On the ground floor are wards for over fifty gynæcological cases, and on the two floors above are labour and lying-in wards for eighty women. Then a large section of the administrative part of the building is taken up with the residence of the Director, Prof. Leopold, and in the hospital building are consulting rooms and wards for his private patients; there is accommodation for thirty 'Hausschwangere,' the pregnant women who are taken in some time before labour and who perform menial duties and also serve for the instruction of pupils in methods of physical examination and so on—a class of patient it is difficult to imagine in this country; finally, we have doubts as to whether our pupil midwives would be content with a bed in a dormitory containing ten to fifteen others, however generous the cubic space allotted to each; in so many ways, indeed, does the German institution of this kind differ from the British that probably the most valuable hints will be obtained from a study of the arrangements of individual parts of the building rather than of its construction as a whole.

Much more valuable lessons may be learnt from the second part of the book, that contributed by the Director, on the arrangements of the wards and theatres and on the duties of the various officials of the clinic, and on the methods of instruction of the medical men and of the pupil midwives. Only one or two of many interesting points can be singled out for notice. In the large operating theatre all fittings of the amphitheatre order have been intentionally avoided, and the spectators are grouped round the operator according to their size, the smaller in front and the

taller behind, as in this way Prof. Leopold considers that the steps of an operation can more easily be followed. On each of the two floors devoted to midwifery cases there are a large and a small labour room. The large labour rooms can accommodate two to five women at the same time and are restricted to normal cases; in difficult cases where operative procedures may be required delivery takes place in the small labour wards, so that other patients may not be disturbed. In the isolation block are included labour rooms and a ward of six beds for infected cases, as well as a ward for cancer cases; the bacteriological laboratories are also in this block.

The duties of all the officials of the clinic, from the chief assistant to the porters, and from the head sister to the pupil midwives, are given at length, and the opportunities for post-graduate students fully set out. In teaching, Prof. Leopold lays great stress on the value of drawings, and he insists on all his students making diagrams whenever possible, in the examination room or in the operating theatre. To us, the chapter on the instruction of the pupil midwives appears the most interesting part of the volume, and certainly there is no subject on which we can learn more from our German colleagues than on this, for they have had so much experience in what is to us but the development of a few years.

The important place which the education of midwives holds in the work of the clinic is shown by the space which is devoted to the subject in this book. Great care is taken in the selection of those applying; they are women of good character, between the ages of 21 and 35, who have reached a certain educational standard and whose capability is vouched for by a medical man. There is a further educational test before admission to the course of six months' training—simple dictation and arithmetic—as well as a probationary test for a period of four weeks. The account of the training given at the Dresden Clinic affords a lesson to us of how much remains to be done in this country in spite of the great advances which have been made of recent years. To mention but a few of the more striking points, we may instance the advantages of a very complete theoretical course, including epidiascope demonstration and the extensive use of models and diagrams. In order to give an idea of general anatomy to these women a still-born fœtus is dissected before them at one of the early classes. In their practical instruction great use is made of the 'Hausschwangere' in order to teach methods of examination, especially abdominal, and of 'phantoms' of which a very large number is installed in the class-room. The clinical instruction is conducted in separate stages, the pupils being employed in the labour rooms for one period and in the lying-in wards at another, and so on. The term of service in the isolation block forms a most striking lesson to them in the necessity for strict cleanliness. The account ends with a brief note on the examination at the end of the course.

No notice of this volume would be complete without reference to the series of thirty-five plates with which it is illustrated. They give views of the outside and of the various internal departments of the clinic, and so well have they been chosen and so well executed that the reader of the volume leaves it with almost as good an impression of the Dresden Clinic and what goes on in it, as he would have if he had just returned from a visit and had had the privilege of a personally-conducted tour with the Director himself. The Dresden Frauenklinik is fortunate in having its new buildings commemorated by a volume in which authors and publishers have together been so successful.

J. S. F.